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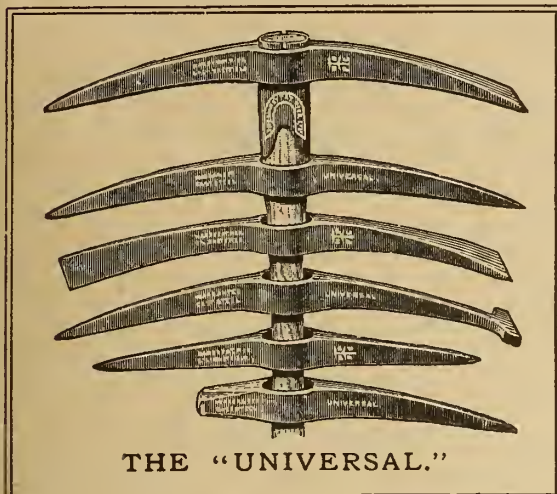
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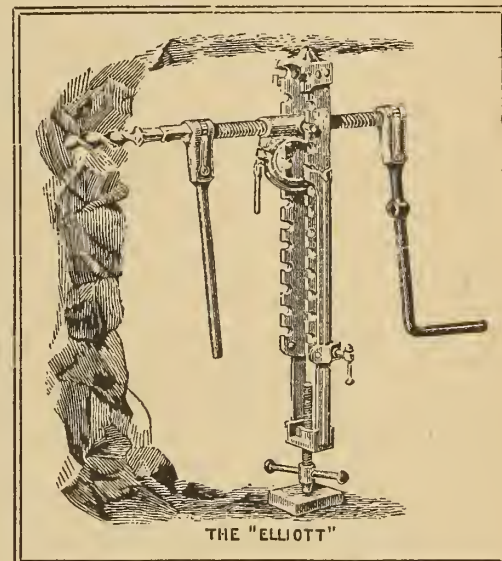
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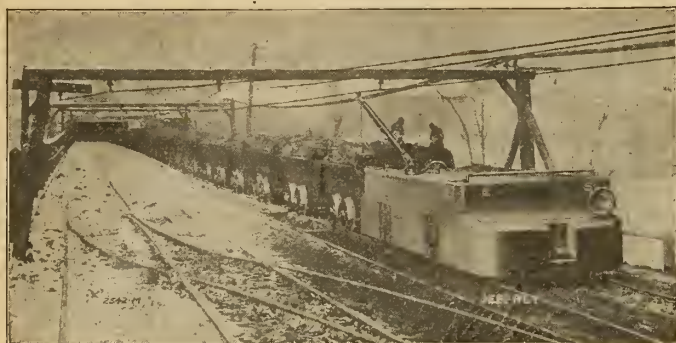


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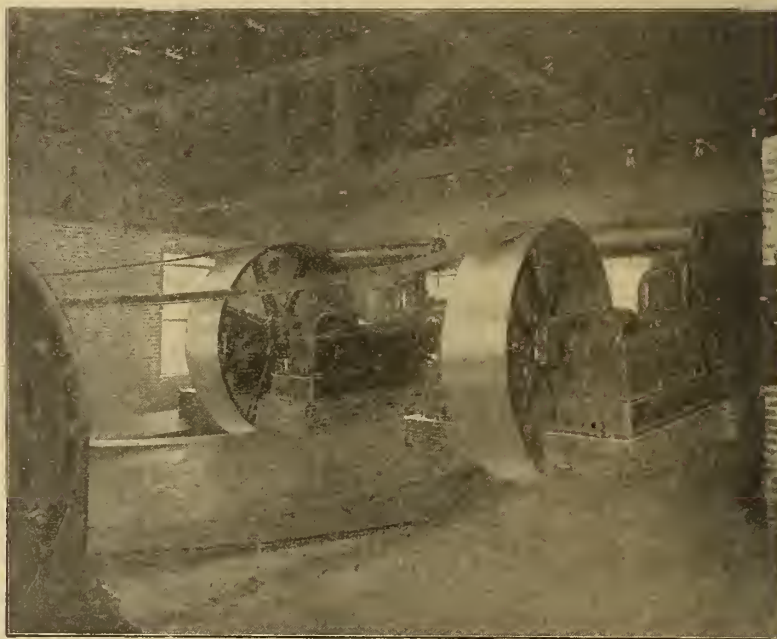
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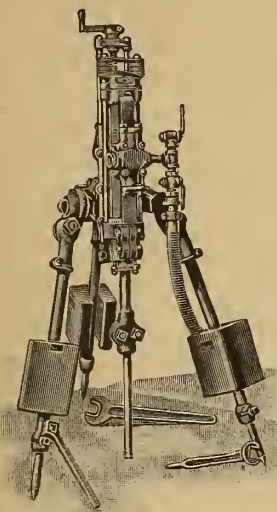
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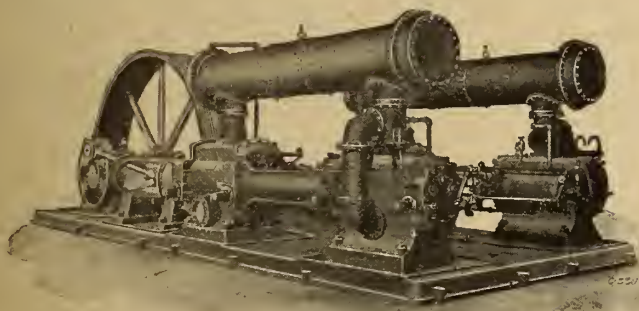
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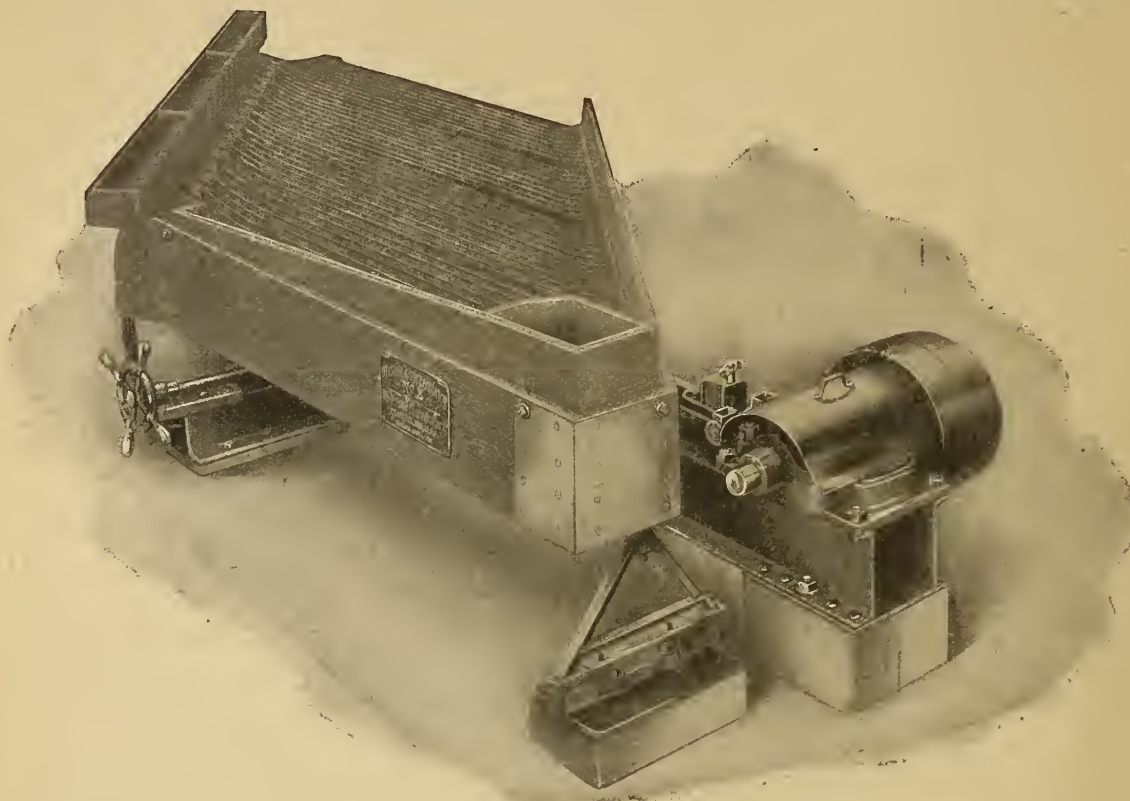
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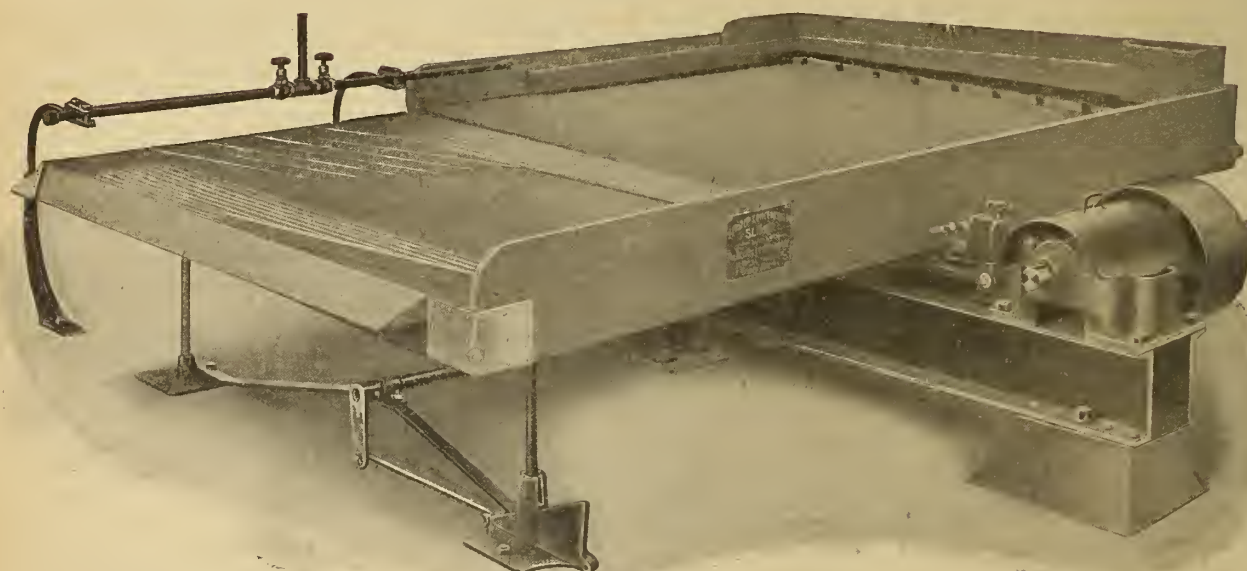
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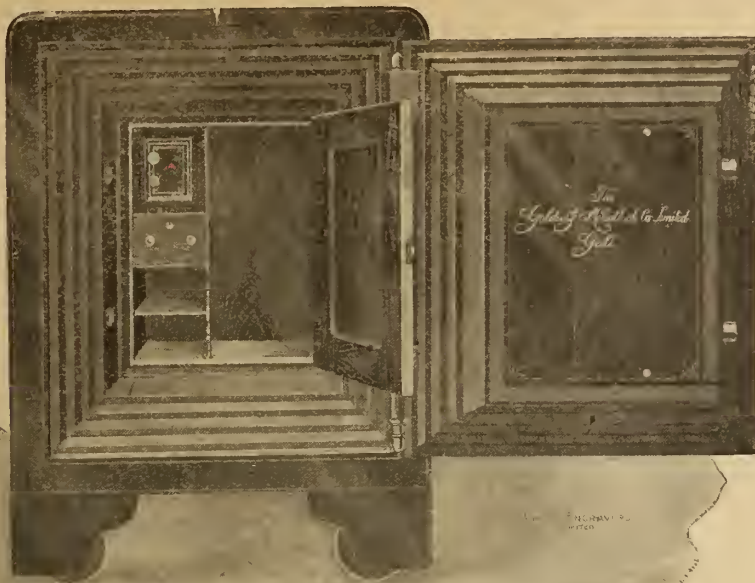
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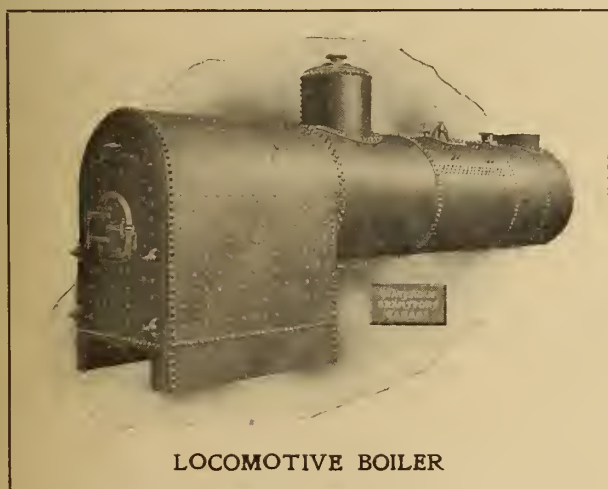
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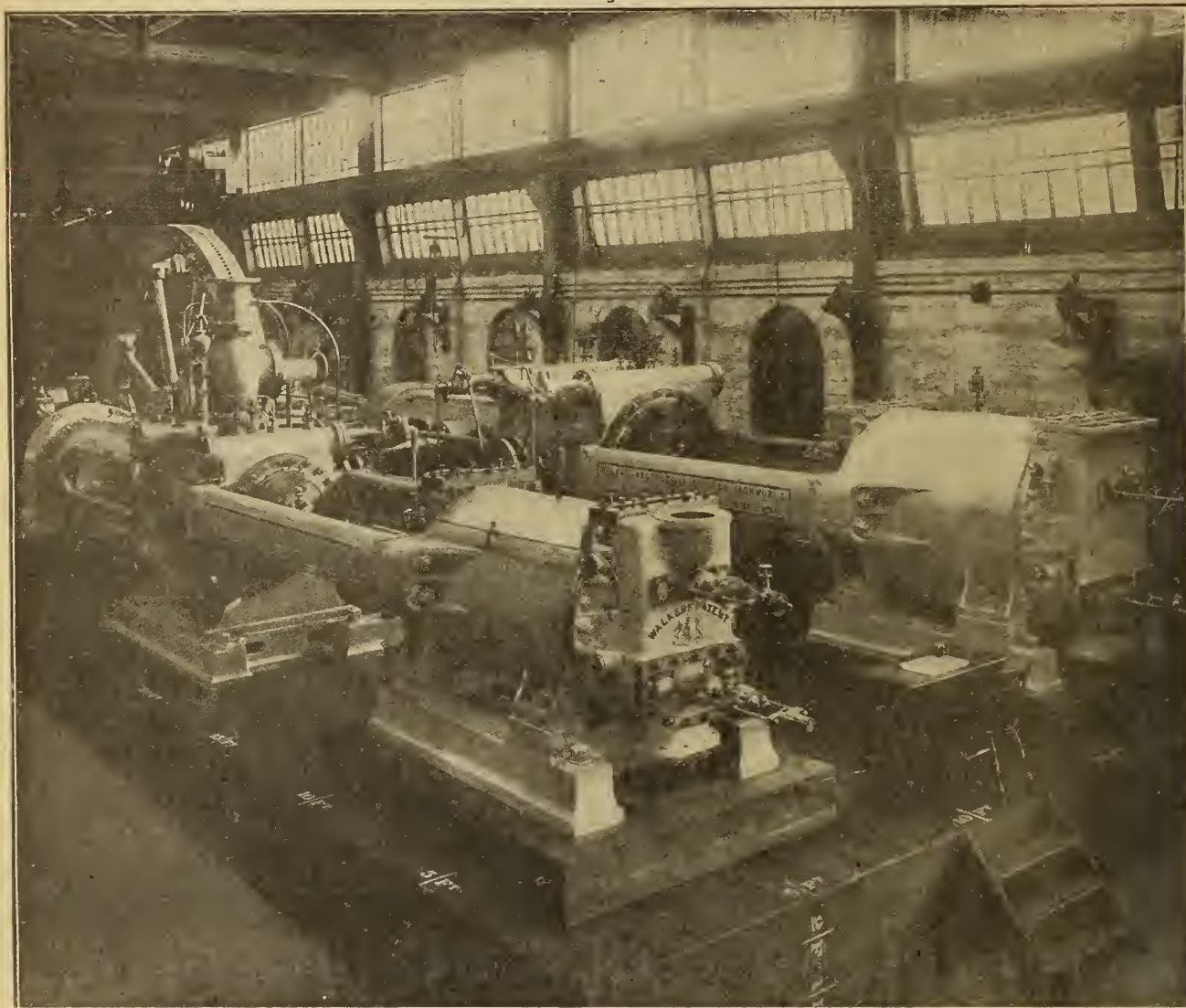
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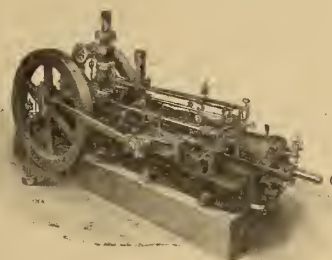
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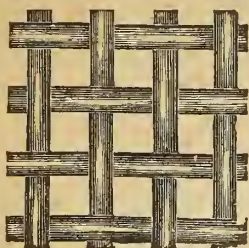
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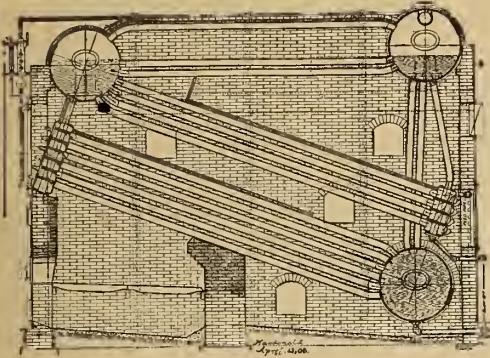
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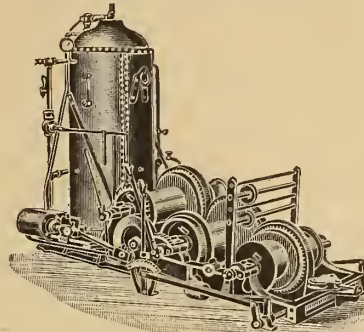
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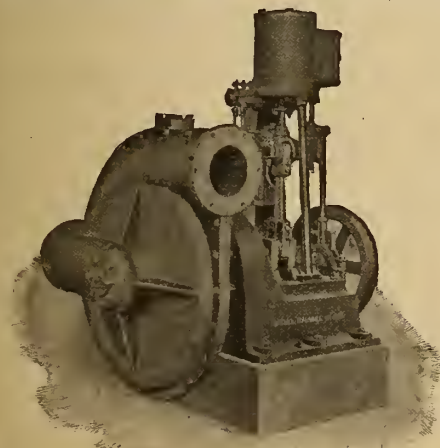
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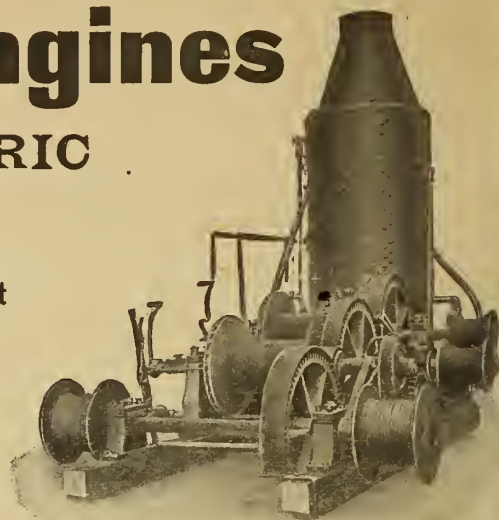
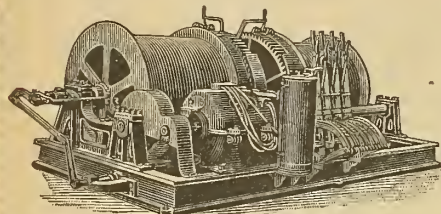
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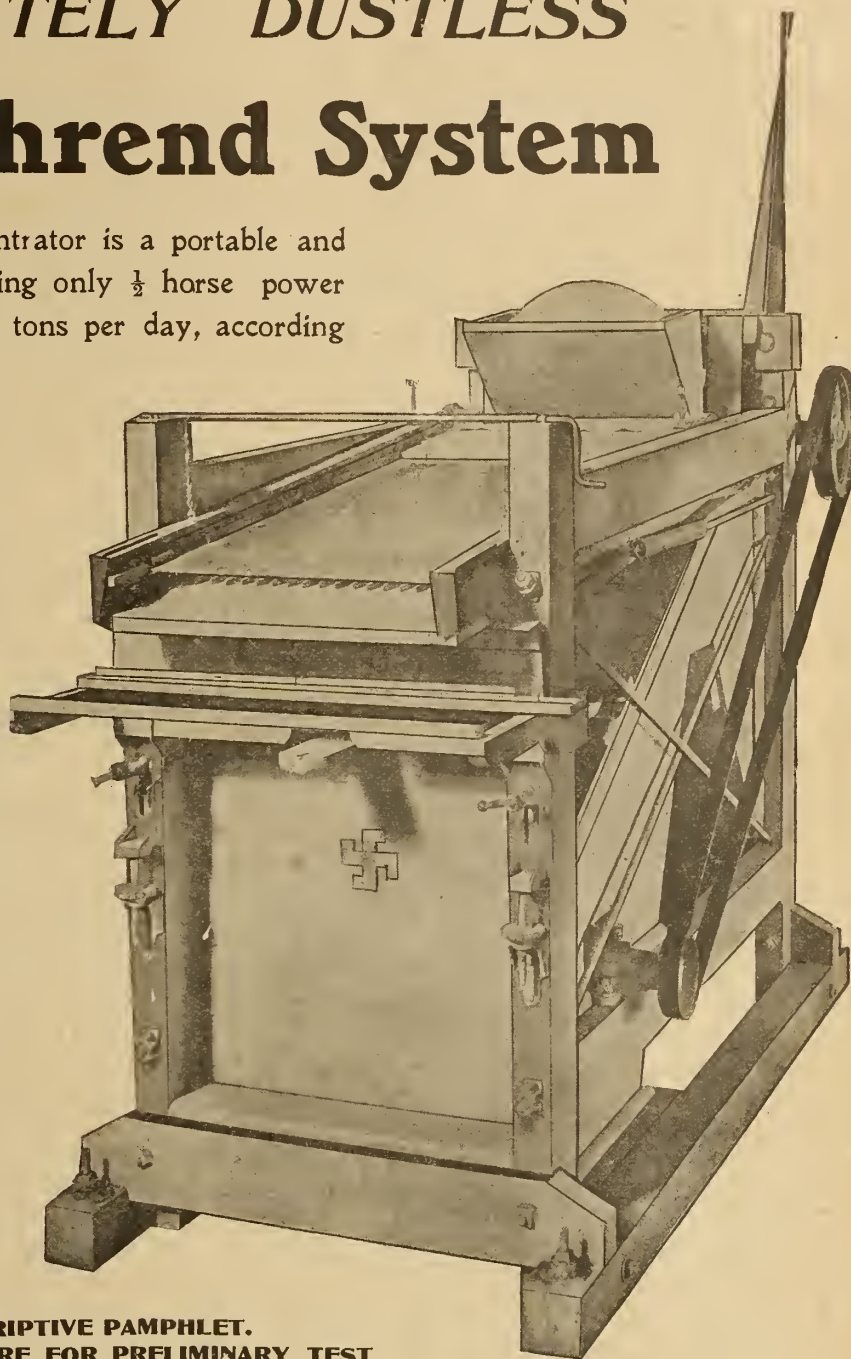
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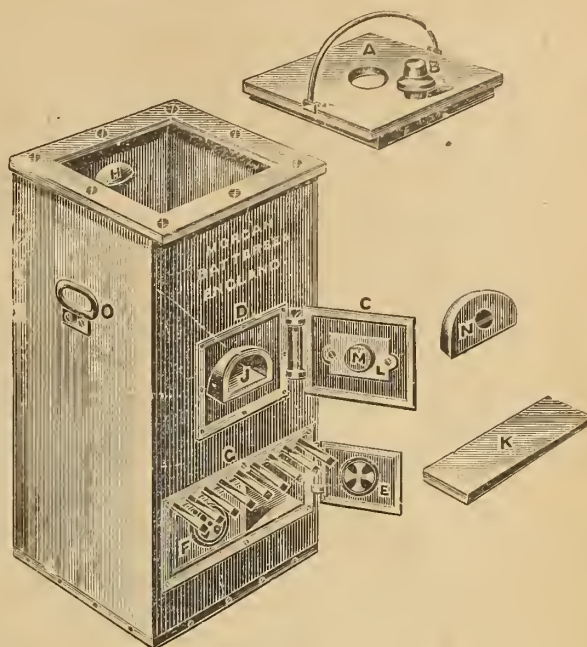
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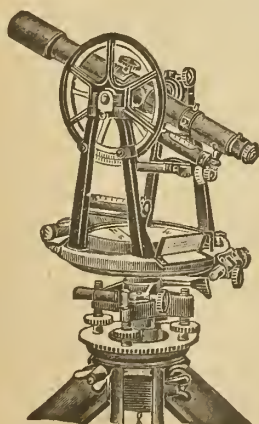


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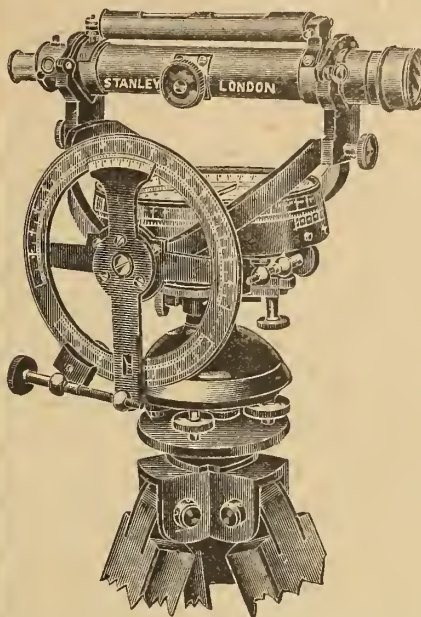
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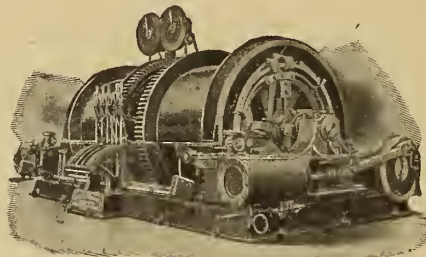
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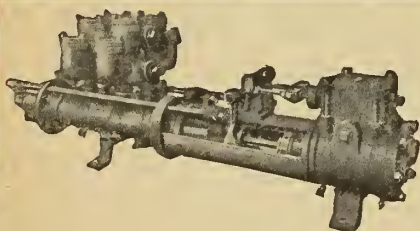
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, January 1, 1909

No. 1

## The Canadian Mining Journal

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Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

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*Head Office* - Confederation Life Building, Toronto.

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## THE YEAR 1908.

### A Review.

Looking over the mining history of the Dominion during 1908, there are more than a few notable events that have influenced the trend of investment and of energy.

We shall not be called to task for placing the activities of the Canadian Mining Institute first in order of importance. When the proposal to invite a large number of foreign mining engineers and technologists to Canada was first discussed, there were many difficulties in the way. The large expense incident to a tour that was to cover Canada from Sydney to Victoria seemed beyond the available means of the Institute. Other objections were urged. But the enthusiasm of the executive officers never wavered. The Federal and Provincial Governments were approached, and their aid was secured. The railways granted special rates. And so it came to pass that the Summer Excursion of the Canadian Mining Institute for 1908 will go down into history as an affair of international importance. Canada has never received such an absolutely effective advertisement of her mineral resources.

The Federal Department of Mines, under the careful hand of the Hon. Mr. Templeman, has played its part during the past year. Between it and the Canadian Mining Institute there is harmony. Both are factors in promoting the welfare and increasing the solidarity of the mining industry. The Department, which as a distinct administrative entity is scarcely two years old, is gaining in strength daily. The numerous strong requests that have been sent to Ottawa urging the retention of the Hon. Mr. Templeman as Minister of Mines are significant of a national interest in the work of the Department.

Recognition of the need of better facilities for technical education has been manifested east and west. In Nova Scotia a comprehensive system of instruction has been organized, and a well-equipped institution of technology is nearing completion at Halifax. This will put within the reach of the rising generation of the Maritime Provinces the opportunity of taking a larger part in the development of their own country. The mining departments of McGill and Queen's are overflowing with students, and the University of Toronto has entered upon the field with renewed vigor. In the west, British Columbia is hastening to provide the machinery for turning out her own mining men, and without doubt the new provincial universities of Saskatchewan and Alberta will include practical branches in their curricula. The prospects for



secondary technical education in Canada are therefore brighter than ever before.

The mineral production of Nova Scotia for 1908 has exceeded that of 1907 by a good margin. The volume of the St. Lawrence coal trade was larger than ever before. The quarrel between those two great concerns, the Dominion Coal and the Dominion Steel, has had the effect of stimulating both to the keenest activity. The latter corporation has entered the foreign markets, and has captured Oriental contracts against British competition. The Nova Scotia Steel and Coal Company, despite the continued depression, has had a good year. So also have all of the smaller coal producers. The gold industry has lost no ground, but has, indeed, gained in several respects. In all branches of the mineral industry labor troubles have been practically absent.

New Brunswick possesses now the rudiments of a large iron industry. Development of the Bathurst iron ore deposits has been most encouraging. In coal mining there has been material progress, although on a very limited scale. However, New Brunswick's possibilities are being more thoroughly advertised. The Province requires a Department of Mines.

The asbestos production of Quebec is waxing steadily. As will be noticed in articles on another page, the productive area of the asbestos regions is extending, and new mills are being erected. The mining and milling of chrome ore, discouraged for a time by the inactivity of the iron industry in the United States is now showing signs of vigorous new life. The enormous hinterland of Northern and Western Quebec is still unexplored. It is possible that a change in administrative policy might have a beneficial effect upon this vast region.

The Province of Ontario has made undeniable advances in several directions. Cobalt has become a mining camp of solid reputation. The Montreal River districts, despite the pernicious activities of fakirs, have fulfilled their early promise, and now await sane development. This will come gradually, along with the subsidence of the stock boom. The production of silver in Ontario, which at present is practically confined to Cobalt, will exceed that of 1907 by nearly fifty per cent. in value, notwithstanding the serious drop in the price of silver. From the great copper-nickel field of the Sudbury region the usual production is expected. Here and at several other points in Ontario the mining of iron pyrites, which mineral is surely replacing Sicilian sulphur in the manufacture of pulp, has been carried on. Another subordinate mineral, talc, is being mined and milled on a much larger scale. The low demand for mica has reacted unfavorably upon its production in this Province. Perhaps the most significant development of the year is the completion of smelters for treating Cobalt ores. The establishments at Deloro and at Thorold have now been in full operation for some time. Ontario's total mineral production for 1908 will show a most gratifying increase.

The Albertan coal fields attracted much attention during the year. While new producers are constantly

entering the field, production has not been seriously augmented, although there has been a normal increase. Another year, however, will see many of these new producers attaining outputs up to the capacity of their plants. In other words, the coal industry of Alberta is yet in the early stages of construction. But the basis of a broad industry is being laid. The Provincial Government is thoroughly alive to the necessity of close inspection of collieries and to the need of departmental supervision.

Mining and its kindred industries are taking a new lease of life in British Columbia. Although last spring's abnormally low copper prices threatened the suspension of the larger producers in southeastern districts, outputs have been not only maintained, but increased. The Dominion Copper Company has fallen by the wayside, but not without hope of recovery. The Consolidated, the Granby, the B. C. Copper, the mines of Rossland, Nelson, and the Boundary, have more than held their own. As in the other provinces, there has been peace between employer and employed. The Fernie fire, a disaster of the first magnitude, caused but a small disturbance in the production of coal and coke. On another page the general progress of mining in British Columbia is well summed up. There are two incidents that must not be omitted here, however. These are the extension of the lead bounty, and the successful establishment of an electric reduction plant for the treatment of zinc ores at Nelson. Both of these events mean much to the miners of West and East Kootenay. In general, it may be said that, owing to carefully administered mining legislation, the constant support of local newspapers, and, by no means last, the character of the men most prominent in the management of the various enterprises, British Columbia's mining industry has been placed in such a condition that its continued growth is assured.

From the Yukon come reports of larger gold yields. These reports do not lack official confirmation. But details will not be published until early in February.

The field of mining in Canada is so tremendous that any editorial review must needs be superficial. But even a casual glance will detect the unmistakable signs of lusty youth in Canadian mining. Here it may be pointed out that there exists urgent need of co-operation between the Federal and the Provincial Governments in many matters pertaining to our industry. Uniformity in statistics and in mining regulations is a crying need. Co-operation in adopting measures for advancing various branches of mining is becoming more and more desirable. This may be illustrated by the effect of Ontario's drastic and praiseworthy treatment of wildeats. Since it is no longer possible for the spurious promoters to advertise in Ontario newspapers, he has turned attention to the newspapers of Montreal and other parts of Quebec. Again, the subject of prevention of mine accidents is one that all the Governments might well consider. In fact, there are many



directions in which co-operation of this kind is absolutely necessary.

Among the more important enterprises launched during the year are the Canada Iron Corporation, Limited, and the German Development Company, Limited. These two concerns are widely different in aims and scope. But both should have a large part to play in the development of our mineral resources.

We have alluded above to the good effects that are traceable to the trans-continental tour of the Canadian Mining Institute and its guests. One of these effects was the rectifying of much misinformation that was current on the other side of the Atlantic. It is not out of place here to make appreciative mention of the vigorous work of an occasional contributor to these pages, Mr. Alex. Gray, now of Montreal. Mr. Gray, as Canadian correspondent to several foreign technical papers, including the Mining Journal, of London, England, has accomplished a great deal towards correcting misconceptions and diffusing the truth concerning Canadian mining affairs.

In conclusion, we wish our readers a New Year happier and more prosperous, if possible, than the year that has passed. We are most thankful to know that this wish will include almost twice as many of our fellow-men as was the case one year ago.

#### **THE GERMAN DEVELOPMENT COMPANY, LIMITED.**

The investment of British and European capital in the mining industry of Canada has not always been attended with fortunate consequences. Needlessly profuse expenditure upon overground equipment, unnecessarily large staffs, lack of competent Canadian advisers, coupled with extravagant expectations, have usually had much to do with the failures. Moreover, it is true that in transit across the Atlantic a mining scheme loses nothing in size. In fact, we have known of Canadian properties that could not have been sold for \$10,000 in Toronto or Montreal forming the *raison d'être* of a £250,000 flotation in London. This kind of thing invites disaster.

Messrs. Frecheville and Marriott, in a paper entitled "A Visit to the Mineral Districts of Canada," speak most favorably of Canada as a field for mining enterprise. "Results in the past, it is true," these distinguished engineers conclude, "have not been uniformly encouraging, but this was probably more due to the methods adopted than to an absence of conditions for profitable working. . . English capitalists would, we believe, stand a much better chance of securing some of the good things . . . if, instead of waiting to have them brought over to London, they had an agent or representative resident in London." To this we may add that the representative chosen by foreign investors should be a mining engineer or mining geologist, preferably a Canadian or an acclimatized English-

man. We may remark that the process of acclimatization is rarely complete, although it is but simple justice to say that the Englishman who knows Canada and Canadians thoroughly is often the most competent man that can be secured.

With this introduction we wish to notice a publication that has a more than usual claim upon our attention.

The first annual report of the German Development Company, Limited, is a pamphlet of 82 pages. It is well illustrated with plans, maps and sections. It is admirably arranged, carefully edited, responsible and dignified in tone.

Scarcely two years ago it was announced that the German Development Company, whose chief stockholders are citizens of Berlin, Germany, had engaged Dr. A. E. Barlow to superintend the acquisition of mineral lands in Canada. Later, it was learned that Mr. D. B. Dowling was to undertake the duty of selecting suitable coal lands in the Rocky Mountains, and this year Mr. James McEvoy was selected to report upon the coal areas already acquired by the company.

It is to be noted that Mr. Martin Cohn, the managing director of the German Development Company, chose as the men who were to direct the activities of his company three Canadians, mining men of the highest standing. Dr. A. E. Barlow, whose name is well known on both sides of the Atlantic, did much brilliant work during his connection with the Geological Survey of Canada. His monograph on the Sudbury ore deposit is a classic. Mr. D. B. Dowling, like Dr. Barlow, a senior member of the staff of the Geological Survey, is a recognized authority upon the coal-measures of Western Canada. As a former member of the Survey staff and as geologist and chief engineer to the Crow's Nest Pass Coal Company Mr. James McEvoy had attained a sound reputation.

And the report before us is thoroughly in keeping with the standards to be expected from men of this class. A large folding map of the Dominion shows in red the situation of the coal lands owned and leased by the company in Alberta, and the silver areas staked in Ontario. The map also displays the main established and projected lines of railway communication.

The reports of Dr. Barlow on certain claims in the Montreal River Mining Division and upon others near Miller and Everett Lakes are followed by the reports of Messrs. Dowling and McEvoy upon the Kananaskis and Bighorn and Brazeau coal lands. Each of these reports will be given fuller attention in this and succeeding numbers of the Canadian Mining Journal. It is appropriate to allude here, however, to the businesslike, methodical, and satisfactory manner in which all of them have been prepared. There is no hyperbole. Each report is a careful, painstaking record of observed facts, and logical, professional deductions.

The probable cost of mining, labor, transportation, timber supplies and markets is fully set forth. The



results of the coal analyses conducted by Dr. Milton Hersey, of Montreal, are presented in such form as to afford a valuable comparison with other Canadian fuels. And it is pleasing to notice that there is a sharp line drawn between "samples" and "specimens." The point of view of each report is economic. None of the reports falls in any respect below the standard that obtains in the publications of the Geological Survey. The attention paid to commercial possibilities will, perhaps, prove suggestive to those of our official geologists who lean too strongly to the purely academic.

It is evident that the German Development Company is building the foundations of a strong enterprise safely and soundly.

### TO OUR READERS.

This number of the Canadian Mining Journal contains some first-hand information from several important mines. The historical sketch of the famous Crown Reserve, of Cobalt, Ontario, is the first authentic statement that has been issued concerning that mine. The summary of operations at the Trethewey mine is instructive. Ten months ago the Trethewey was looked upon as being in a more or less dubious position. Now it is strongly entrenched in the forefront of producers. For this both President A. M. Hay and Manager G. F. McNaughton deserve credit. And this can be given without casting aspersions upon anyone. The simplicity of the system of ore treatment at both the Crown Reserve and the Trethewey is to be commended.

The report of La Rose Consolidated contains much food for thought. The careful tabulation and differ-

entiation of costs is praiseworthy. It would be well if a larger number of mining companies could see the wisdom of this course.

The Hosmer collieries, owned by the Canadian Pacific Railway, are now producing coal and coke. This will mean a readjustment of the fuel traffic of British Columbia. The article by General Manager Stockett is most timely.

Space will not permit enumerating the other articles that appear. We must make mention, however, of Professor H. E. T. Haultain's keen analysis of the comparative value of the mill-test and the assay. Writing in non-technical language, Professor Haultain has succeeded in setting forth this practical subject in a way that will appeal to all readers.

For our forthcoming numbers we have a long list of timely articles and reports from the pens of Canadian workers. We begin the New Year with the firm belief that our columns will prove of greater value and of higher interest than ever before.

### THE TYRRELL PRIZE.

Twelve months ago it was announced in these columns that Mr. J. B. Tyrrell, of Toronto, had offered a prize of one hundred dollars for the best collection of specimens of Ontario minerals. Professor William Nicol, of the Kingston School of Mining, and Dr. T. L. Walker, of the University of Toronto, consented to act as judges. The time appointed for submitting collections expired last month. The collection of Mr. W. P. Battersby, of the School of Mining, Kingston, Ontario, was awarded the prize.

## SOUTHEASTERN BRITISH COLUMBIA.

### A Resume of the Mining Industry for the year 1908.

J. A. OHREN.

The year 1908 has passed to the annals of history, and when the final analysis is taken of the operations of the mining industry of British Columbia for the twelve months of the year, it will be found that, despite many drawbacks, the chief industry of this Western province has taken another step forward. The first day of January, 1908 dawned on the mining industry when general affairs were unsettled throughout the country. In Southeastern British Columbia the big copper producers of the Boundary were closed down; mining was quiet in the premier lode-gold camp, Rossland; and there were grave fears that the Le Roi Company would find it advisable to stop work at its big mine there. Business was inactive throughout the Slokan, and the probability of the Dominion lead bounty ceasing in June did not tend to encourage work on the low-grade silver-lead properties of that district. Rumor had it that the Sullivan mine, in East Kootenay, would close down any day, and the Queen mine was the only property making any headway in the Sheep Creek section. But, as a perusal of the following article will show, it was not long until sunlight

broke over this dreary aspect and things moved rapidly toward a better condition.

British Columbia is the principal mineral producing province of Canada, mining over thirty per cent. of the total mineral output of the Dominion, and mining is the cardinal industry of British Columbia, contributing forty per cent. of the production in a list enumerating mining, lumbering, agriculture, fisheries and manufacturing. During the past two years the mineral production of British Columbia has amounted to over \$51,000,000. The mining and smelting industry of this province is established on a firm and substantial basis—more particularly in the principal mining districts—but this substantial form of work is fast extending to the more meritorious of the smaller camps. There is an inclination toward consolidation of interests. This is more especially the case in the low-grade sections, where plenty of money, mining and smelting operations on a large scale, and economy throughout, are necessary. The big companies, like the Granby, B. C. Copper, Consolidated Mining and Smelting, and others, have adopted a far-sighted policy



to provide for the future, and have acquired valuable mines in the different mining districts. In this way these companies secure suitable ore for proper fluxing at the smelters, meanwhile developing properties that will very likely furnish the ore supply of the future.

### **The Mining Laws.**

The mining laws of British Columbia have been, to some extent, compiled from mining laws in operation elsewhere, and so far they have been adequate to the demands made upon them. There are a few minor changes that will no doubt be made as soon as it is convenient to revise the Act. Among these changes is the suggestion of having the leases of mineral claims expire at 12 o'clock noon instead of at midnight. This would be a reasonable change, as under the present law great inconvenience is caused the mine owners. Claims are often re-staked in a wrong manner in the darkness, and the chances for evil practices are enlarged. An important decision in a contest over apex rights will soon be given by the Supreme Court of Canada in the case of *Byron S. White Co. vs. the Star Mining and Milling Co., of Sandom*. As this decision will be the first one of its kind rendered in this country, it is looked forward to with interest by mining men here. The case will have an important bearing on the future of lode mining in the Slocan.

### **Transportation.**

Railway facilities in British Columbia are improving very much every year. The V. V. & E., which will give the copper ores of the Similkameen an outlet, will soon be built to Hedley. It is expected that the work will be advanced to Princeton by the end of May, 1909, and that trains will be running into Vancouver in a year. This line has already proved of much convenience to the mines of Yale District. The Canadian Pacific Railway is now building from Spence's Bridge to Midway, via Nicola and Penticton, affording railway facilities to a region rich in coal and metal mines. The Kettle Valley line is extending its road into Franklin camp, a copper district of promise. In the Crow's Nest District the improvements have been innumerable. On the first one hundred miles of the western end of the Grand Trunk Pacific one-third of the work has already been done. Railways are needed in the Windermere and Duncan River sections. The C. P. R. has a line surveyed from Golden to Fort Steele, which will give an outlet for the products of the Windermere mining division, but no definite move has been started toward construction. An electric line was proposed for the Duncan River Valley, but so far this enterprise has not matured.

### **Markets.**

The markets for the mineral production of British Columbia are widening in an economical way as the consumption of these products in Canada increases. At the present time a great portion of these products is marketed abroad. Most of the gold is shipped to Washington Government assay offices, from whence it is sent to various parts of the United States for coinage. Much of the refined silver is disposed of in the Middle and Eastern States, although large consignments of the 999 fine silver made in British Columbia are shipped to the Orient, where it is made into money. To-day the refinery of the Consolidated Company at Trail is producing the silver used for coinage purposes at the Ottawa mint, and there is no doubt but that in a few years most of the gold and silver now mined here will be required at Ottawa for coins,

providing a more economical market than the foreign markets now afford. In fact, it is understood here that the entire gold output of British Columbia will be coined at Ottawa before another year has elapsed.

Copper matte and blister copper are sold in the United States. The lead pipe, bluestone, antimony, etc., produced here are to a great extent now disposed of in Canadian markets, which are yearly consuming greater quantities. Most of the zinc produced is shipped to Antwerp, small quantities going to the United States. The producers of lead and zinc in the United States are adverse to the admission of Canadian or Mexican lead or zinc to that country, and at this writing there is a strong sentiment against the reduction of the tariff barrier now existing.

### **Labor Conditions.**

Labor conditions are, at present, very good in British Columbia. There is a plentiful class of labor for mining work requiring skill, and the supply is at present adequate to the demand. Of unskilled labor there is, perhaps, a small surplus. Miners here are now paid \$3.50 per day for eight hours' work, shovellers \$3, and common mine labor \$2.75. Machinists, etc., range from \$4 down. The scale in force is the normal scale adopted by the Arbitration Board at Nelson in the spring of 1907. There promised to be a little friction in the Boundary last spring, when the mines first started up, some of the miners wishing to go on strike for the abnormally high wage scale that prevailed prior to the general shutdown, but a majority of the men, satisfied to get back to work at the normal scale and recognizing that conditions did not warrant a higher wage, stayed at work, and the agitators had to reconcile themselves to the situation. There was some discontent shown at wages coming down in many of the Slocan sections, but this did not amount to anything. The B. C. Copper Co., when resuming work in the spring, found skilled miners of the better class scarce, many of these men having gone to the United States, but in due time they were able to fill their ranks.

At the present time labor conditions here are all that could be asked for, and employer and employed are on the best of terms. This applies to both the coal and metal mines.

### **Geological Survey.**

The work of the Canadian Geological Survey is very much appreciated in the mining districts here in which this worthy organization has been working. The work in Rossland, Phoenix, Greenwood, Hedley and the Slocan is proving invaluable to the mining interests of those districts. The work planned in the Tulameen section should disclose some interesting information. Franklin camp, on the north fork of the Kettle River, and the Ymir-Sheep Creek districts should prove worthy of notice by this department in the future.

### **The Boundary.**

Some encouragement was lent the dark outlook at the beginning of the year by a slight rise in the price of silver and copper over the figures that prevailed during the last few months of 1907, and the work done by the Granby Consolidated M. S. & P. C. at its Phoenix mines. About one-half of the regular force was working, but the shipments were augmented week after week, so that in a very short time this company was breaking all former records of ore shipments from this district. No doubt, partly encouraged by the work of the Granby Co., the management of the B. C. Copper



Co. ordered work resumed at the Mother Lode and Oro Denoro mines, and ore shipments were begun in May. The smelter, after undergoing important improvements, was blown in, and the work has progressed satisfactorily up to the present day. The economical practice of mining and smelting in the Boundary, coupled with the heavy fixed charges of these big companies, made it a more profitable operation for the large copper producers to mine, smelt, and sell their products on a low market than to remain idle. This proving to be the case with the two principal mining concerns of the district, in June the Dominion Copper Co. resumed mining, and later on blew in the large furnaces at the Boundary Falls smelter. Increased shipments by the Consolidated M. & S. Co. of Canada from its Centre Star group at Rossland and heavy shipments from the Slocan-Kootenay made it necessary that the company have Snowshoe ore for fluxing purposes, and accordingly that mine was opened up in August, and shipments were begun to Trail smelter in September. Just now the surplus production of the Snowshoe is being sent to the Greenwood smelter of the B. C. Copper Co. The Consolidated Co. is actively executing development on its Phoenix Amalgamated holdings. This put all of the big Boundary producers on the active list during the year, where they have remained, with the exception of the Dominion Copper Company.

Southeastern British Columbia is dependent upon the Crow's Nest coal fields for its main supply of coke and coal, and in August a devastating forest fire sweeping over that section and doing \$200,000 damage to the coal and coke producing industry, for a time caused the Granby and Dominion Copper Companies to suffer a coke shortage. This shortage indirectly resulted in the Dominion Copper Co. ceasing operation, but the Granby Company easily weathered the situation by "banking" several furnaces at the smelter, and with the aid of its heavy emergency coke supply. The B. C. Copper Co. was not affected, as it received its supply of fuel from Coleman, Alberta. Most of the year a car shortage has been felt in the Crow's Nest coal mining district for the hauling of fuel, and at the time when the crops were moving East this situation was critical, but did not reach an acute stage. Even now, as the year draws to a close the car situation is not all that could be desired.

The Dominion Copper Co. did not make much headway during the year. While it was expected that the last partial reorganization of this company had placed it on a good financial basis, this has not proved to be the case. The company has been tottering along at a disadvantage financially, and the fuel shortage subsequent to the Fernie fire was sufficient to hurl its structure to the ground and carry its affairs into the courts. It has been asserted that this company has wasted money. Mining men here are slow to give this statement credence. It is a fact that considerable money has been spent in an effort to make the operations of the concern pay, but it takes a large sum of money and modern methods to make mining pay in the low-grade districts, and only those who know all the facts can tell where the faint line occurs that separates an unsuccessful, but proper, effort toward the economical from wasteful operation in this district.

The Granby Company during the past year has spent over \$200,000 in improvements and changes. This company has erected new buildings, bought a new and larger converter plant, blowing engines, compres-

sors, hoists, locomotives, and so forth. The B. C. Copper Co. has installed new ore-crushing, air-compressing and smelter machinery while at the Snowshoe-War Eagle holdings of the Consolidated many changes have been made in the power plant.

### Rossland.

In the early part of the year, when those of a pessimistic mood were predicting a close-down for the Le Roi, Mr. W. A. Carlyle made a thorough examination of the mine, and mapped out a plan of work which has been followed during the year with good results. While shipments from the Le Roi this year will fall behind the tonnage sent out in 1907, the class of ore sent to the smelter has proved to be of a higher grade, the consequence of which has been a good profit on each month's operations, the climax of these earnings being reached in October, when the net profits on the company's operation for that month were in the neighborhood of \$50,000. Mining operations on the Consolidated claims, the Centre Star, War Eagle, Iron Mask, Idaho, Enterprise, etc., have given good results, and much progress was made during the year. The different lodes being mined and developed on these claims are resulting in all that could be desired, and the ore shipments from this group will exceed the output of the Centre Star group during last year by over 50,000 tons, and it is needless to say that the profits will be proportionally increased. The operations of the company in this camp have been resulting in a profit of over \$35,000 per month, it is stated; of course, the exact figures will not be known until the year's work has been wound up. Much new ore has been opened up in the Le Roi 2 ground and the company has paid six shillings in dividends this year, four shillings of which was paid from the net earnings of the mine during 1908, and it is almost safe to say the shareholders will receive another dividend from the earnings of the past year. This company, working on a small but economical scale, in a camp where mining is fraught with many difficulties, is an example of businesslike mining. It is true the ore they find in the Josie lode carries twice as much gold and copper as any found in the Le Roi or Centre Star, but the veins are narrow, and good management is necessary to make the company pay dividends.

Nearly every one of the small claims and prospects in the camp that have a mineralized ledge in sight has been leased and worked during the past year. The miners who were able to make this form of work pay, however, were few. The lessees of the Evening Star made several thousand dollars on their venture, and the men working the Bluebird made money; but it has been very much a matter of nip-and-tuck with the others, and a couple have quit work losers. The lessee in this camp has to put a good sum of money into the ground before he can obtain results, on account of the low grade of the ore. The White Bear, Jumbo, and other properties have not been operated this season, but the officers of both companies state that money will soon be available for work. The development of the Giant-California, behind which are Granby interests, has not given the results expected, the long cross-cut failing to strike the desired continuation of the known ore shoots. Diamond drilling is now being done in an effort to locate this ore.

### Nelson District.

The extension of the Dominion lead bounty relieved the anxiety that was felt by the low-grade lead-silver



miners in the early part of the year, and as a result of this extension work has been begun on properties that would have remained idle for some time to come, and mining has been continued on mines that would otherwise have shut down. This bounty has been an important factor in the progress of mining in this district to the active stage that exists to-day.

The Silver King mine has been operated part of the year with good results on the upper levels, the unwatering of the lower portion of the mine is now going on, and the next twelve months will no doubt see some important developments at this property. In the Sheep Creek section the Queen and Nugget mines have come into prominence by their big earnings and gold bricks, and indications from the Ymir mine are more hopeful than they have been for years. The Arlington, Second Relief and other mines throughout this southern district are doing well, and new interest is shown by the owners of the smaller prospects.

Partly owing to litigation, the production of some of the Sandon mines has been restricted; but there is hope of this matter soon being settled, and with the strikes recently made on the Reco, Rambler-Cariboo, Eureka, and others, it is expected that Sandon will once more be as busy as in days gone by.

Over \$250,000 has been expended on the Blue Bell, and everything is now in line for profitable mining and milling of the immense quantities of low-grade lead-zinc ore on this group. The production of the White-water in zinc concentrate and ore has been steady, and the year's work will show good results. The output of the St. Eugene for the past twelve months will exceed the ore shipped in 1907 by about 2,000 tons. It is said that there is now a better lot of ore ready for stoping in the upper levels of the St. Eugene than there has been for years. The Sullivan mine and smelter shut down early in the year, due to financial difficulties and a change in the character of the ore, making it harder to treat. A movement is afoot to adjust Sullivan affairs. It is estimated there are 150,000 tons of ore blocked out in this mine.

### In Conclusion.

One need not be an expert in mining affairs to be able to discern the march forward that the mining industry in British Columbia has taken during the past year. The output of ore from the Boundary will exceed that of any previous year by over 270,000 tons; the Rossland output will exceed 1906 by 15,000, and 1907 by 10,000 tons, despite the falling off in Le Roi shipments, while Slocan-Kootenay shipments show a more healthy condition than last year, although the actual list shows a smaller tonnage treated, the shrinkage being caused by the shut-down of the Sullivan, La Plata, and other heavy producers of low-grade ore; but the advance among the smaller mines—the coming profit-payers of this district—is noticeably greater.

The prospects for the year now before the district are most propitious. The mines are prepared for a year of heavy production. The big political and financial questions that affect the country at large are settling nicely; Eastern capital is flowing easily westward, this being more noticeable than before the troublous times of a year or so ago, the actual effect being seen in the purchase by Eastern men of the Queen, on Sheep Creek, and the Iron Mask mine, at Kamloops. There is a tendency to give the miners their supplies at a more reasonable price than has prevailed in the last year or two. Labor also has been brought to see that inflated wages do not bring any great benefit, indirectly working a boomerang effect on themselves, and, best of all, the metal market is becoming firm and prices are rising to a normal figure based on a healthy demand. There has been a reconciliation. All have stopped a moment and looked back at their error, have recognized the worthlessness of frothy inflation, and are desirous of working forward during the year 1909 on a sound, wholesome basis. If this lesson is kept well in mind during the next twelve months, it is safe to predict that 1909 will be a more prosperous year by far than 1908, as the material is proved, and all that is necessary is the proper application of energy to make another pace forward.

## C. P. R. COLLIERIES IN THE WEST.

### The Bankhead and the Hosmer Collieries—A Review.

By General Manager Lewis Stockett.

The collieries of the **Bankhead Mines, Limited**, are situated on the main line of the Canadian Pacific Railway Co., at Bankhead, Alberta.

During the year 1908 the mine has been further developed by the driving of an incline on No. 6 seam to open an upper level. This incline, on a pitch of 32°, has been equipped with a cage and counter-balance, and operated by a pair of 10x12 hoists. From this incline, cross-cuts have been driven to the Nos. 5 and 4 seams. A slope has been sunk on the No. 4 seam, pitching 35°, on which the cars will be hoisted direct on the track, by a pair of 12x15 engines. To prevent the coal spilling off the cars on this pitch, covers will be placed on them, and automatically removed at the head and foot of the slope.

An additional unit of machinery has been put in the breaker, enabling a larger tonnage to be handled, and the coal more thoroughly prepared.

In the briquette plant, steam coils have been substituted for the melting of the coal tar pitch, instead of by direct fire.

The production of coal for the year 1908 will be about 250,000 tons, and of briquettes about 36,500 tons.

**The Hosmer Mines, Limited.**—This is a new colliery, located on the Crow's Nest Branch of the Canadian Pacific Railway, at Hosmer, B.C., and did not commence shipments until December 18th, 1908. The production of both coal and coke for the year 1908 consequently will be small. A detailed description of the plant is as follows:

The property consists of six sections of coal lands, and two sections of surface, on which the town of Hosmer, and improvements connected with the plant are located.

The seams, of which there are thirteen in number,



varying from 4' to 30', are being opened by a tunnel, driven at right angles to the measures, and starting at a point about 600' higher than the railroad track at Hosmer Station. Two tunnels are being driven parallel with one another, the larger tunnel consisting of three compartments, two of which will be used for haulage purposes, and the third as a travelling and pipe way, and the parallel tunnel, consisting of one compartment, will be used as a return air course, in connection with the ventilation of the mine. The tunnel is in at the present time 3,700', and has cut eight of the seams, and ultimately will have to be driven in 5,000 to cut the thirteen seams. These seams vary in dip from sixty-five degrees to thirty-five degrees. The tunnel was started in the Fernie shales underlying the coal measures, reaching them at a distance of 847', and the first seams cut are, therefore, the lower ones of the series. The coal is bituminous, decidedly rich in hydro-carbon, and, therefore, an excellent coking coal as well as a steam coal.

The ventilation of the mine will be produced by a 20' x 9' Walker Fan, running as an exhaust fan, but so fixed that, if necessary, it can be run as a blow fan. This fan will be driven by a pair of 30" x 16" engines, connected up to the fan by a rope drive, the steam for which is supplied by three 80 H.P. boilers. The fan is of steel and concrete construction, and the engine-house of brick. The other buildings at the mouth of the mine will be a concrete lamp house and time-keeper's office, locomotive house for the compressed air locomotives, and wash house, with baths and lockers for the use of the miners.

The coal will be lowered to the level of the tippie by a steam actuated, double track incline, each track being an independent incline. The mine cars, holding two tons of coal each, will be lowered in trips of twenty cars, and the empty cars hoisted in convenient numbers. The haulage engines are a pair of 28" x 48" first motion engines, with 8' drums, fitted with clutches and brakes, which, with the reversing gear and throttle, are all handled by steam, working through cataraet cylinders.

From the foot of the incline, the cars will be hauled to the tippie, by a compressed air locomotive, and dumped into the same over a cross-over dump, passing over shaking screens to remove the slack for the coke ovens, and over picking bands, for the purpose of removing the refuse from the larger size coal. Storage bins are provided to hold 2,600 tons of coal, 200 tons of rock, and 3,000 tons of slack for the coke ovens. The rock in the rock bin is drawn out into iron self-dumping cars, and hauled to the refuse dump by a compressed air locomotive. The coal in the coal bins is loaded into box cars by a box car loader, and the open cars from chutes. The slack from the slack bins is loaded into seven-ton larries, and hauled by a compressed air locomotive over the coke ovens.

There are 240 Bee Hive Coke ovens, twelve feet in diameter, and seven feet high, which will give an output of 300 tons per day. Belgian ovens, with by-product recovery, and distilling plant, are in contemplation for the next ovens required.

The power house building, of re-enforced concrete, with steel floor joists, and roof trusses, which roof trusses are covered with corrugated iron, contains two low pressure compressors, and two high pressure compressors, the former to furnish air at 100 lbs., for the rock drills, inside hoisting engines, and various other purposes around the plant; the latter to furnish

air at 1,000 lbs., for the five compressed air locomotives. The seventy-five K.W., alternating current generators, for the purpose of lighting the town and plant, are driven by two 125 H.P. engines. All of these engines are fitted with cut-off valves, the purpose being to carry steam, at 120 lbs. pressure, cut off early, and use the steam expansively. The exhaust steam from all of these engines is connected into two 20" pipe lines, one known as the atmosphere line, and the other as the heater line. By means of valves, the steam from any or all the engines can be turned into either of these lines. When turned into the heater line, the steam passes through a 1,500 H.P. Hoppe's Exhaust Steam Heater, heating the boiler feed water to 200° F. A ten-ton travelling crane has been installed for the convenient handling of the machinery.

A boiler house, also of re-enforced concrete, with steel trussed roof, covered with corrugated iron, and cement floor, contains four 250 H.P., Babcock & Wilcox boilers, with chain grate stokers, and appliances for the convenient handling of coal and ashes.

The town on the company's property at the present time consists of a general office, mess house, three officers residences, several foremen's houses, a large boarding house, and sixty miners houses, and hospital, all neatly painted and supplied with water and electric light. Quite a large and progressive town has been built across the railroad tracks, on property not owned by the company, and where are located the stores, hotels, etc., necessary for the maintenance of a miners camp.

The Elk River property is situated 45 miles north of Michel, B.C. During the past year continuous explanatory work and prospecting work has been done, with a view of opening up two or three large mines, when a branch of the Canadian Pacific Railway has been built from Michel to the property.

## MINING IN QUEBEC DURING 1908.

(Special Correspondence.)

Mining has been relatively quiet in this Province during the year with, nevertheless, a notable progress.

Asbestos mining and milling is still the leading industry, and quite an excitement has been prevailing in some districts which had not attracted much attention before, especially at East Broughton. Three mills have been in operation there, and two more are under construction, viz., one owned by the Frontenac Asbestos Company and the other one by the Boston Asbestos Company. This last one began to run in October with good results. The mill is well equipped and has been treating successfully some good fibrous material recently discovered.

Some prospecting has also been done in the district of Bolton, and we understand that mining operations and building of mills will soon begin there.

Besides there are several other companies in organization in different places of the asbestos district.

The mines at Thetford and Black Lake and Danville have been in operation as usual and now all use electricity as power.

The Black Lake mining and concentrating of chrome ore is going on as usual. Two mills representing 50 stamps have been in operation during the year.

Near Sherbrooke only one copper mine has been in operation at Capelton, and another one, being worked successfully in a neighboring locality. Several pros-



pects have been made in the same vicinity, in Ditton, and at Lake Megantic for gold, and very likely some development work will follow next summer.

In the Ottawa district, the mica industry has come to a standstill for some time on account of the general depression of business. The graphite mines at Buckingham show some activity and we expect to see the mills erected there to become producers of prepared graphite.

Near Calumet, a magnesite mine was open, which we expect will be soon developed. In the vicinity of

Montreal two very important Portland cement factories have started operations.

In the northern country, no important discovery has been made and prospectors are awaiting the building of a railroad for developing Chibogomo district. During the season two explorations were made by the department to the north; one to Chibogomo, which has confirmed the discoveries already made there, and the other one to the north of Outardes River, on the Labrador coast, to study the possibilities of that district.

## THE CROWN RESERVE MINING COMPANY, LIMITED.

About one year ago all that was evident of the Crown Reserve mine, apart from the enthusiasm of Mr. Samuel Cohen, was a body of water, twenty-three acres in extent, near the centre of which was a small island, where now stands the mine office. At that time the only tangible evidence of silver was a small diamond drill core.

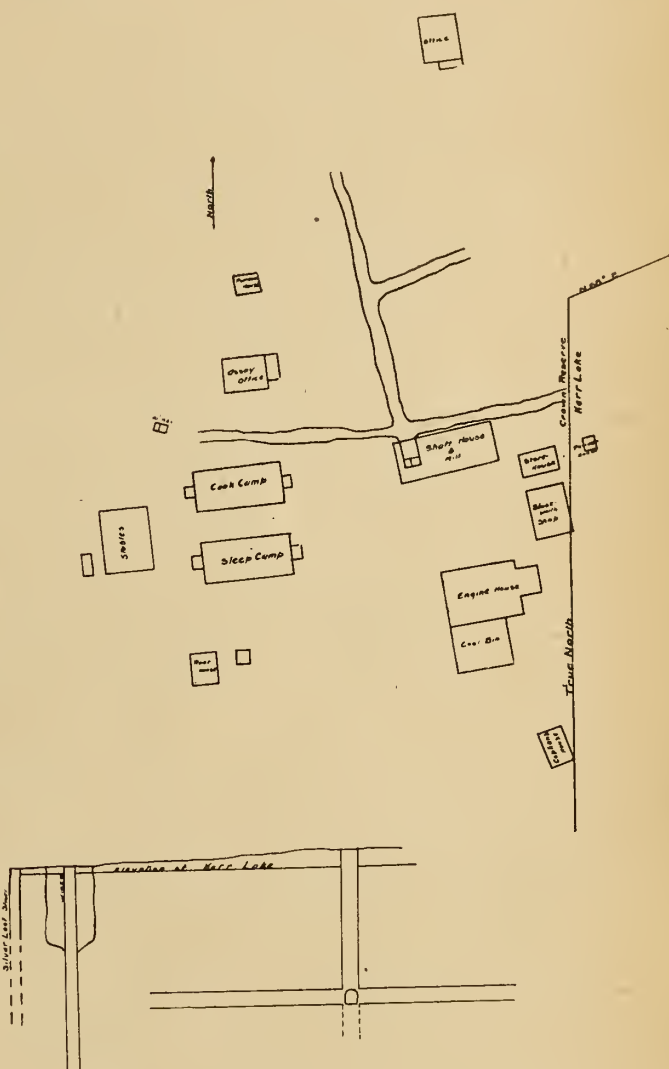
The work of lowering the lake was begun last October. By February 1st, 1908, the water level was lowered eight feet by means of the canal from Kerr Lake to Glen Lake. The change exposed a peninsula of land about three acres in extent. The peninsula could hardly be termed "terra firma." With the exception of the point, the exposed area was composed of marl, in some places fifteen feet deep, and not unlike quicksand. Contrary to expectations, the rock did not slope out gradually from the shore, but dropped abruptly, leaving a bank of marl.

With a dozen men and no plant, Mr. Cohen commenced to dispose of the marl. He first allowed it to freeze, and then worked off fifteen-foot slices. Thus an open trench was formed, three sides of which were frozen marl and the fourth the shore of the lake. The trench was deepened until bedrock was reached and the vein exposed. A little tar-papered shack, in which the men slept, was the only building then on the property.

Money was now an absolute necessity. The vein as exposed on the surface was only six inches wide, and showed richly for but a length of ten feet. It was determined to take out enough ore to provide the small amount of machinery necessary for further work. Mr. Cohen, therefore, gouged out from the surface  $6\frac{1}{2}$  tons of ore and shipped it by express to the American Smelting & Refining Company. The ore, consisting practically of silver and calcite, was cupelled. The gross value of the silver extracted was \$13,000. With the returns from this first shipment a 30-h.p. boiler and a small hoist were purchased. An open cut, 30 feet long, was now started. The next carload of ore extracted was probably the richest shipment of silver ore ever shipped. It averaged 9,000 ounces to the ton, and there were over five tons of nuggets bagged from the car.

The open cut was continued until a depth of 50 feet was reached. At the same time Mr. Cohen commenced sinking the main shaft at a point 200 feet east of the open cut, where a small outcrop of rock occurred above the level of the lake. After sinking to a depth of 100 feet, a cross-cut was driven north to catch the main vein. This was encountered 25 feet from the shaft. Up to this time about \$350,000 worth of ore had been

taken from the open cut. Open cast work was then discontinued, but a winze was sunk from the open cut to develop the vein. The winze is now down 135 feet in rich ore.



PLAN & PROFILE  
THE CROWN RESERVE MINE  
Scale 1" = 120'

As the accompanying plan shows, the vein has been drifted on from the new shaft about 100 feet to the east line of the property, and west to within 30 feet of the open cut. Assuming the vein to be continuous

through this 30 feet, a continuous ore shoot 300 feet in length is indicated. In width the vein measures from 6 inches to 33 inches. An average of 12 inches may be considered as under the actual truth. As stated above, the first car shipped averaged 9,000 ounces. This, of course, was exceptionally rich. The high-grade average now is about 5,000 ounces. There is also a mineralized zone extending four feet on either side of the vein. After the high-grade ore is picked out of the muck, the half-inch screenings from the whole face of the drift, seven feet wide, averages 250 ounces to the ton.

But it gives one a startling conception of the richness of Crown Reserve to be informed that at one time responsible visitors could see a vein 33 inches wide which averaged 10,000 ounces to the ton. One piece of ore weighing 435 pounds was sold to the Geological Survey at Ottawa. The Survey willingly paid for this specimen at the rate of \$5 per pound. Last summer, when the European guests of the Canadian Mining Institution visited the Crown Reserve, there was a pile of high-grade ore in the little ore-house measuring 8 feet by 10 feet by 10 feet. This was valued at \$200,000.

With the exception of the ore from the open cut, all ore shipped has been won from development. The stopes are still intact. The cross-cut to the north has intersected eight silver-bearing veins, ranging from  $\frac{1}{2}$  to 3 inches in width, and showing in some cases high silver contents. Cross-cutting is in progress eastward to cut the 7-inch vein of the Kerr Lake property, which, it will be remembered, was discovered by Mr. Cohen. The Kerr Lake people are drifting on this vein not far from the Crown Reserve line. The Crown Reserve cross-cut will run down the lake, and, at 500-foot intervals, other cross-cuts will be continued to the shore line for air.

Around the main shaft is a substantial concrete collar, which comes above high water mark. All of the buildings also, including the shaft-house, ore-house, and power-house, in which there is any machinery, are on solid concrete foundations to bedrock.

The bunk-house and dining-room accommodate 100 men. The shaft-house is 10 feet high. The power-house is equipped with one 100 h.p. boiler, one 30 h.p. boiler, a six-drill Sullivan compressor, a dynamo, hoist, pumps, etc. There are also blacksmith and machine shops. In the latter is a machine lathe. The assaying and drafting building and the ore-house, which is practically a little mill, must also be mentioned. In this ore-house all of the high-grade ore is put through a small Moussette mill, which extracts the nuggets. The nuggets are melted into bars in an oil furnace. The pulp from the Moussette mill is high-grade ore. It contains about 4,000 ounces of silver to the ton. Everything except the high-grade ore is put through an Austin gyratory crusher, which crushes the material to pass a two-inch ring. The crushed material then passes to a trommel, which separates the  $\frac{1}{2}$ -inch stuff containing 250 ounces per ton. From the trommel the 1-inch and 2-inch goes over a picking belt, when the high-grade ore is picked out by hand. By this simple process practically all of the valuable ore is saved. Only the silver that is tied up in the country rock is lost.

An extraction of 95 per cent. of the total silver that goes into the ore-house is counted upon. When the dump is of sufficient size to warrant the installation of a mill, either the ore-house can be more completely equipped or the dump can be sold to one of the custom mills. At present the simple operations outlined above are found to be cheap and effective.

In conclusion, in February, 1908, the first shipment of 61½ tons was made. In April regular shipments were begun. Including the ore on hand in December, 1908, there has been shipped a total of 540 tons. Of this 140 tons were screenings averaging 250 ounces to the ton, and the balance, 400 tons, was high-grade ore. Thus the value of ore shipped during little more than nine months of initial development is about \$850,000. Until August all of the work was done by hand. Since then only three machine drills have been running.

This is indeed a record as interesting as it is remarkable.

## THE MINING OPERATIONS OF THE DOMINION COAL COMPANY.

### Article IV. THE HUB SEAM.

By F. W. Gray.

The Hub Seam is the highest seam that has been preserved in the land area of the Glace Bay Basin. A glance at a map of the Basin will illustrate the thought that gave the seam its unusual and appropriate name. The visible crop circumscribes a limited area of a semi-circular shape measuring roughly one mile between the intersections of the seam with the face of the cliff at the shore, and a little over half a mile at the extreme radius inland, taking Table Head as a centre point. The shaft of the Hub Colliery forms therefore the approximate centre of a series of concentric arcs described by the outcrops of the coal seams, and the general appearance of the geological map suggests a wheel with its central "hub."

In Mr. Hugh Fletcher's table of equivalency the Hub is regarded as the equivalent of the Barasois in the Lingan Tract, and it is not present in the Morien

Basin. According to this table there are two seams above the Barasois, one of which, known as the Carr Seam, is 6 ft. 5 ins. in thickness and is situated 190 feet above the Barasois. These seams may be represented in the submarine portion of the Glace Bay Basin, and there is a possibility that at some remote future date the equivalent of the Carr Seam may be reached from the submarine workings of the Hub Seam by means of an inclined cross-measure drift. Only a very narrow strip of this seam can, however, have been preserved at a sufficient depth below the sea floor to enable it to be worked, and the fact of its possible existence is mentioned merely as interesting, but not as a serious factor.

The average thickness of the Hub Seam is 9 ft. 6 ins. It is characterized by a more or less undulating pavement, and local variations in the character of the seam have been met with. It yields an excellent house or



steam coal, with a lustrous appearance and a decidedly cubical fracture. It is to be regretted that Nature has not left us a greater area of such a valuable coal seam as the Hub. This is a comparative statement, having in mind the much greater areas in the lower and less profitable seams. Dr. Edwin Gilpin estimated a total accessible area in the Hub Seam equal to a yield of 35,000,000 tons, but there is every reason to believe that undersea workings can be prosecuted at a much greater distance from the shore-line than the limit used by Dr. Gilpin in his calculations.

Considering the seams as a whole the amount of coal which at a future date may be won from the submarine areas of the Glace Bay Basin will depend to a large extent on the extent of the dislocation which attends the seaward course of the Bridgeport or East Bay Anticline, and the extent of the submarine denudation along the crest of the fold. This as yet is a matter of conjecture and hypothesis only, but there are

from what has been found to occur in the land area, the miner of the future may come across local troubles and variations in the character of the coal seams. Writing in 1872, Dr. Edwin Gilpin made the following statement: "The former extent of this coalfield to the eastward is now a question beyond the reach of solution, and the conviction is forced upon the mind of even the most casual observer that it is but a remnant of the measures deposited at the coal-producing period of the carboniferous era; that the rim only is left of an immense district, now lost under the Atlantic."

As one would expect from its exposed position, the Hub Seam was one of the first to be worked in the Glace Bay Basin. Much of the early history of the coal trade of Cape Breton centres around that portion of the shores of Little Glace Bay which is included between the crops of the Hub Seam. Not far from the Hub Colliery is Burnt Head, the scene of exciting passages in the long-contested struggle between the French and the English

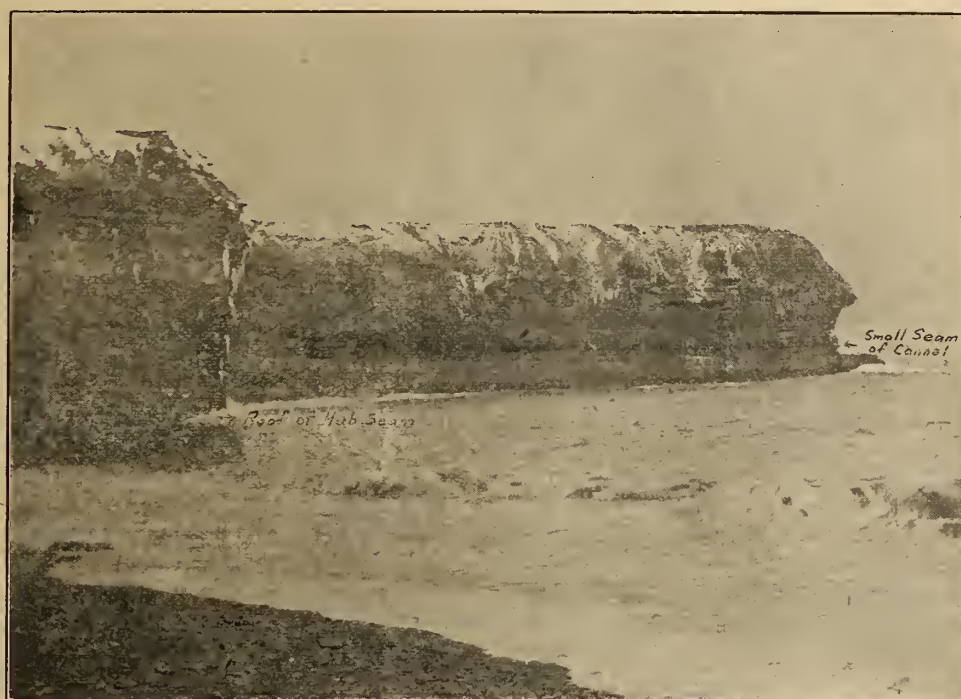


TABLE HEAD—LITTLE GLACE BAY.

On the left hand of the view the roof of the Hub Seam dips under the water. A small seam of cannel coal can be seen along the side of the headland. The photograph was taken four hours before high water.

indications which favour the theory that the continuity of the lower seams is not altogether interrupted by the anticline in the whole of the accessible submarine area. So far as the Hub Seam is concerned, however, its submarine outcrop lies at least three miles inside the anticlinal line.

On the southern boundary of the basin the coal seams crop out with great regularity from Glace Bay to Cape Percy, where they pass into the ocean. The projection of the line of outcrop of the Lorrway Seam as shown on the Geological Survey corresponds with the seam that shows itself in Flint Island—an outlier of Cape Percy, separated by a distance of two and a half miles. A line drawn on approximately the full dip of the seams through Flint Island will pass the axis of the Basin at a point seven miles to sea off the shores of Table Head. One might assume, therefore, that no marked interruption in the continuity or dip of the seams occurs within the accessible area of the coalfield; although, reasoning

for the possession of Canada. During the English occupation from 1745 to 1749 the garrison at Louisburg was supplied with coal taken from the entrance to the Little Bras d'Or and the vicinity of Burnt Head. Being apprehensive of attacks from Indians, who were friendly to the French, the English erected a blockhouse on Burnt Head. Remains of the ditch are still visible, although the actual site has long since been swallowed by the sea. Mr. Richard Brown quotes from a history written in 1760 by M. Pinchon, the Secretary of the French Governor of Louisburg, as follows: "The English had a coal pit at Burnt Head defended by a fort of considerable strength, where with fifty men they successfully repulsed the attacks of the savages and kept possession of the fort." Mr. Brown adds that the pit took fire in 1752, when the fort also was entirely consumed. Traces of this fire may still be seen along the crop of the seam for a distance of nearly one mile. The surrounding measures, mostly soft shales, have been baked by the



heat to every gradation of colour, and a very pretty gravel may be quarried out of the cliff. Pebbles are to be found on the beach, so rounded by the sea's action as to show the different laminations passing from green to red in all its variations. In the cliff itself are to be found perfectly preserved fossil impressions, while at other points the cliff has been fused into a mass resembling a furnace slag-dump.

The Hub Colliery has seen numerous vicissitudes in its life of fifty years. After the cancellation of the monopoly of the General Mining Association, Mr. Archbold mined the Hub Seam by means of shore levels from 1858 to 1861. In the latter year the Glace Bay Mining Company acquired the mining rights from Mr. Archbold and sunk two shafts, 130 feet deep, down to the Hub

acquired the property they pumped out the workings, and between 1895 and 1899 they extracted about 350,000 tons. In 1899 the mine was again abandoned, and was once more pumped out in 1903, when the curtailment of the company's output by the Dominion No. 1 fire made it necessary to open up some additional supply. The mine was largely extended and the deeps were driven a long distance into the submarine field, when operations were again interrupted by a disastrous fire which occurred on the 14th of December, 1906. It was found necessary to flood the mine, and hoisting operations did not recommence until November, 1907.

Old residents invariably refer to the Hub Colliery as the "Roost." In the early days of mining there, a long ridge of sandstone ran out into the sea near Burnt



Crop of Hub Seam in base of cliff near Table Head. Portion in shadow on left hand is where sea was first admitted into workings after the fire. The cavity is now silted up

Seam. One of the shafts was used for hoisting coal, and is still used for that purpose by the present owners. The other shaft was used for ventilating purposes, and was originally intended for a water shaft also, but was never so used, as the workings were drained by an adit driven out to the shore. Practically the whole of the land area was extracted, and in many places the measures were cracked up to the surface, admitting the outer air. The Glace Bay Mining Company erected a surface equipment and constructed a railway one mile in length to Glace Bay Harbour, which they enlarged and used as a shipping port, as described previously. They continued to work the Hub Seam until they had opened up the Harbour Seam at the Stirling shafts in 1876, after which they abandoned the Hub Mine and allowed it to fill with water. When the Dominion Coal Company

Head, and was a favorite resting place for the common cormorant or Shag. It was generally known as the Shag Roost. One of the shore levels worked by Mr. Archbold commenced on the Shag Roost, and in course of time the mine came to be known by the shortened appellation of "the Roost."

The fire of December 14th, 1906, is a matter of history and may be referred to more fully. The fire appears to have commenced in a pumphouse in the pit bottom in the afternoon of the 14th of December, and its origin has never been definitely ascertained. The smoke followed the return air up the hoisting shaft and rendered it difficult to use the shaft or approach the seat of the fire. It was decided to reverse the fan to clear the smoke and get access to the flames. This operation took a long time, owing to the fact that all



the underground connections and doors were frozen by the intake air. All attempts to extinguish the fire failed. The heat was communicated to the fan, which failed about 9 o'clock in the evening. All the men were withdrawn, and it was decided to seal the hoisting shaft. While the work was in progress, however, the air suddenly reversed itself and a gush of flame came up the hoisting shaft, set fire to the bankhead and practically

in. A shaft was then sunk from the surface to the bottom of the coal seam down the face of the cliff. This work was commenced on the 29th of December and continued without intermission, with four shifts per day, until the 9th of January, on which date the pavement was reached. A level was driven to a point below the sea-level at high tide, and a communication was made with the sea, which resulted in letting into the mine a



The Hub Colliery (Dominion No. 7) before the fire of December 14, 1906.

the whole of the surface erections were destroyed in half an hour. Finally it was decided to flood the mine, and all the available surface streams were turned into the shaft. On the 16th an old level at the shore, close by the adit previously referred to, was opened up, and the water of the Atlantic at high tide flowed into the mine. The volume of water flowing in was too small, however, to effectively and quickly flood the mine, as the seat of the fire was at the shaft bottom, and the whole of the deep workings required to be flooded before the water would come in contact with the fire. The inflow of

great volume of water. On the 28th of January the water had risen to sea-level and covered the seat of the fire. The hoisting shaft was unsealed on the 2nd of February, and the opening into the ocean was closed by a concrete dam. Pumping commenced on the 14th of February, and continued until the 1st of November, when the face of the deeps was reported dry. The regular hoisting of coal began in December, 1907, about a year from the date of the fire.

The work of unwatering the mine was greatly hindered by the corrosive nature of the mine water. The



The Hub Colliery after the fire of December 14, 1906.

water was also considerably hindered by the silting up of the opening every tide by gravel washed in from the sea. It was found impossible to clear away the gravel because of the enormous amount of carbon dioxide gas that the opening emitted. In addition to this the opening was situated under a dangerous overhang of cliff weighted by icicles which made the place unsafe to work

upper part of the workings was filled with slack, which in the old days was an unsaleable bye-product and was left in the mine. As the water drained out of these old workings and percolated through the slack it acquired a particularly virulent character and worked havoc with the pumps and necessitated constant repairs. Another peculiar feature of the unwatering operations was



a frozen saline deposit which had formed to a considerable thickness along the rim of the water as it receded. This substance resembled a coarse sea-salt, and it was found to have absorbed appreciable quantities of carbonic oxide gas, which diffused into the atmosphere as the deposit was disturbed by the shovel in the work of clearing. The workmen suffered a little from headache and the nausea that is associated with carbonic oxide poisoning.

Since the fire the Hub Colliery has been entirely remodelled both above and below ground, and it is practically a new mine. At the present time the output is

B. & W. boilers, rated at 500 h.p., and room has been left for an additional battery when it is required. A small brick extension on the back of the house contains the feed water pumps and a Webster feed water heater. In this extension is also housed the fire-pump, which is a Knowles duplex pump 14 in. by 7 $\frac{1}{4}$  in. by 12 in. The fire discharge lines consist of a 6-inch main with 4-inch and 2 $\frac{1}{2}$ -inch connections. Hydrants are placed in the bankhead, the rescreening house, and at numerous points around the colliery. The circulating water and the water reserve for fire protection purposes is contained in a circular reservoir holding 400,000 gallons, situated imme-



No. 7 HEADFRAME.

800 tons per day, but in the summer of 1909 it is expected to reach 1,200 tons daily.

The surface power plant is not a large one, as a large part of the motive power used at this colliery is obtained from the Central Electric Plant.

Before the fire the mine had 828 h.p., of Babcock & Wilcox boilers, housed in a wooden building. This was completely destroyed by the fire. The boilers were repaired, not being greatly damaged by the fire, and a new frame building was erected, 60 ft. long by 40 ft. wide.

A new brick boilerhouse, 65 ft. 8 in. by 51 ft. 8 in., with cast steel roof trusses and corrugated iron roof, has been erected since the fire. It contains two batteries of

diately at the back of the boilerhouse. The new steel stack of the boilers recently installed is 7 ft. 9 in. diameter inside the shell, 100 ft. high, cast-iron base plate, lined with 4-inch fire brick for 35 ft. from the base and with red brick for the remainder of the distance, secured with two sets of guys.

The coal-hoisting engine is a horizontal, double engine, built by the Jenckes Company, cylinders 24 in. by 42 in., with Corliss valve-gear. The drum is 8 ft. diameter by 6 ft. on the face. The hoisting rope is 1 $\frac{3}{8}$  in. diameter, passing over 12 ft. pulleys. This engine went through the fire, but was successfully repaired.

The man-hoisting engine is a new one, replacing the



one in use before the fire, which had outlived its usefulness. It was built by Matheson, New Glasgow. It has cylinders 18 in. by 36 in., slide valves, drum 6 ft. 8 in. diameter by 12 ft. 6 in. The rope is  $1\frac{1}{4}$  in. diameter.

There are two Norwalk air compressors with a capacity of 2,000 cubic ft. each. Before the fire they had single steam cylinders, but they are now tandem-compound, air cylinders 19 and 30 by 30 in. stroke, steam cylinders 20 and 34 by 30 in. stroke.

The bankhead is an entirely new structure. It is built of hard pine on concrete pedestals, and is 105 ft. long by 31 ft. 6 in. wide. The head-frame is built of 10 in. by 12 in. hard pine posts, with backstays 12 inches square. The height of the centre of the pulleys is 75 ft. This head-frame, in common with those of No. 10 Colliery and the International Water Shaft, has a simple device for hoisting the winding pulleys into position. The framework is carried up 17 ft. above the centre line of pulleys, and is fitted on either side of the framework with projecting  $1\frac{1}{2}$ -inch eyebolts to which the tackle can be attached. By this provision the pulleys are easily hoisted and swung into position, and an operation which is often a cause of annoyance is thereby simplified.

The coal is hoisted on the ordinary dumping cage, which discharges into a weigh-tank. The latter empties itself onto feeder belts, which travel at the rate of 13 ft. per minute, and empty their contents onto a triple battery of shaking screens operated by eccentrics from shafting. From the screens the coal passes on to two picking belts, 40 ft. long and 5 ft. wide, which feed a loading belt 35 ft. long and 35 ft. 6 in. wide. The arrangements are such that any coal for the boilers can be dropped out of the weigh-tanks into tubs and run along a special trestle to the boiler room. The whole of the bankhead machinery is operated by electric power. Each side of the screening machinery is driven by a separate motor of 15 h.p. The loading belt is driven by a  $7\frac{1}{2}$  h.p. motor. All the machinery is operated by separate friction clutches.

The screening arrangements are practically a duplicate of those at the Reserved Colliery, and were built by Plowright Bros., of Chesterfield, England. The machinery had been installed shortly before the fire, and after the fire it was found to be badly twisted. It was repaired by the Brown Machine Co., and put into the new bankhead.

Other surface erections belonging to the colliery are the Wash House, Warehouse, Lamphouse, Firemen's Hall, Forge and Carpenter Shop.

The mine is ventilated by a Capell fan, 11 ft. dia. meter, by 8 ft. 6 in., running at 220 revolutions, with a capacity of 200,000 c. ft. per min., at 2 ins. W. G. The fan is enclosed in a steel and concrete casing, and is driven by a 12 in. by 15 in. Robb engine. The air shaft is circular, 9 ft. 6 in. diameter. It is 130 feet deep, the same depth as the coal shaft. A large amount of work has been done underground since the fire in building permanent brick and concrete stoppings, and improving the air courses.

The coal shaft is divided into three compartments, two for coal hoisting and one for the man's cage. It is 11 ft. 4 in. by 20 ft. 8 in. over all. A new concrete lining has been placed around the mouth, extending down the shaft for a distance of 24 feet from the surface. The coal compartments are 6 ft. 6 in. by 10 ft., and the man cage compartment is 5 ft. 2 in. by 10 ft. The after-effects of the fire necessitated repair work in the bottom. Large concrete piers and wood packs made out

of old railway ties have been placed around the shaft bottom, and the roof has been completely boarded over.

A new electrical haulage system has been put down underground since the fire. The hoist is driven by a 200 h.p. Westinghouse variable-speed induction motor, 550 volts, 288 revolutions. The engine itself was built by Matheson, of New Glasgow. It is fitted with a Hill type friction clutch. The driving sheave, or "bull-wheel," is 6 ft. 6 in. diameter. The engine house is brick-lined, with concrete floor and foundations, and the roof is supported by 24-inch I beams, with about 20 ft. span. The mine cars used are of two tons capacity. The track gauge is 2 ft. 2 in. The haulage rope at present used is 12,500 feet in length, of  $1\frac{1}{8}$ -inch wire rope.

Approximately below the shore-line underground is an electrically driven pump made by Hathorn Davey, of Leeds, Eng. It is a three-throw reciprocating pump, 10-inch plungers, 24 in. stroke, with a capacity of 500 gallons per minute at 175 feet head. It is driven by a 75 h.p. Westinghouse motor, constant-speed, running at 480 revolutions per minute. The pump is housed in a brick-walled chamber, with concrete floor, and roofed with steel I beams.

Further down the deeps is a McDougall turbine pump, built in Canada. It has a 5 in. discharge, three-stage impellers, and has a capacity of 550 gallons per minute against a head of 310 feet. It is driven at 1,420 revolutions per minute by a 100 h.p. Westinghouse constant-speed induction motor.

The transmission cable for the pumps passes down a borehole 163 feet deep, situated not far from the shore. The cable used is lead-covered with paper insulation. The conductors are three in number, No. 4-0. A  $\frac{3}{4}$ -inch wire rope is attached to the surface and passed down the borehole, to which the cable is attached by lashings every two feet. At the foot of the borehole the main transmission is divided, one lead going to each of the two pumps described. In the mine the cables are laid in the side of the travelling deep in wooden boxes along the pavement. The discharge of the two pumps is made through a common borehole at a point near the transmission borehole. The discharge hole is lined with 8-inch wrought iron casing, cemented in, and finished with a cast iron section at the foot of the hole. The cable borehole is also lined with 6-inch wrot. iron casing.

The transmission cable for the haulage plant is conveyed in a similar manner down a borehole near the colliery office.

The coal is undercut with the ordinary "puncher" machine, for which compressed air is used. A few small pumps are also driven by air.

Every precaution has been taken underground to protect the workings against fire. Every engine-house and pumphouse has a small chemical fire-extinguisher, and, as in the other collieries, the air lines are so arranged that they can be connected with the pump discharge at short notice. The pit bottom is plentifully supplied with extinguishers and stand-pipes.

Nothing but safety lamps are used in the mine. At the present time lamps of the Marsaut type are in use, but they are very shortly to be replaced by the A. & B. type, which is in use in the other mines. The mine is naturally a safe one, being more or less damp, and gas is not present in any large quantities.

Under normal output the mine will employ between 300 and 400 men. The horses number around thirty.

In the colliery yard is situated also the Rescreening Plant for the Central Banking Station. This erection



is 81 ft. long and 39 ft. high to the centre of the haulage pulley. The coal is filled at the Banking Station into cars and hoisted up a long inclined trestle to the screens where the slack is taken out. The haulage is effected by a Matheson engine 18 in. by 36 in., housed in a wooden building.

The work of rebuilding the Hub Colliery after the fire gave opportunity to the officials of the Dominion Coal Company for some very prompt and effective construction work. The photographs accompanying will give some idea of the completeness of the destruction and of the rapidity with which the reconstruction work went forward. The Rescreening Plant, for example, was com-

on the iron ores and the status of the iron and steel industry of Canada.

Mr. Kraynik took part in the excursion of the foreign engineer and metallurgists arranged by the Canadian Mining Institute through Canada in August and September last. His lecture was the more interesting as generally little is known across the water regarding the iron resources and the condition of the iron and steel industry in this country, and this interest was clearly evidenced by the discussion on the subject afterwards. Mr. Kraynik's paper dealt with the

(1) General condition of the iron industry in regard to the iron ores mined in Canada, the iron ores of



RESCREENING PLANT AT DOMINION No. 7.

mended and finished between the 6th of April and the 6th of May, months in which construction work is not favoured by the weather in Cape Breton. The head-frame and bankhead were also reconstructed within the space of three months.

#### LECTURE ON CANADIAN MINING INDUSTRY AT DUESSELDORF, GERMANY.

Before a large gathering of representative mining, iron, and steel men, at Duesseldorf, Rhenish Prussia, on the 6th December last, Mr. Ernest Kraynik, M.E., metallurgist, of Berlin, delivered an interesting lecture

Nova Scotia (Annapolis, Londonderry, and Newfoundland).

(2) Iron and steel metallurgy in the Dominion Iron and Steel Works, Nova Scotia Steel Co., and Londonderry Iron Works.

(3) Iron ores in Quebec and New Brunswick (Bathurst), works at Drummondville, Radnor, etc.

(4) Iron ore resources in Ontario, Animikie in comparison with Mesabi formation, the Helen mines Moose Mountain and Atikokan iron ranges.

(5) The works at Midland, Port Arthur, Sault Ste Marie, Hamilton, and Deseronto.

(6) The feature of electric smelting in Canada, the



Grondal process, the electric furnace at Welland and Niagara Falls.

(7) The mining industry and its future in British Columbia and Vancouver.

### GYPSUM.

Opportunities for developing large gypsum properties are not lacking in Canada. Gypsum, as a mine

product, will stand only a limited cost of transportation. Most of the New Brunswick and Nova Scotia quarries are on or close to tide water. Hence cost of handling is reduced to a minimum. If, however, the gypsum were reduced to the plaster of commerce and the arts at or near the quarry, the range of the market would be extended very considerably. The necessary plant is cheap. Installation of this sort would increase the value of the quarry immediately.

## LA ROSE MINES, LIMITED.

Editor's Note.—In response to our request for information, the management of La Rose Mines, Limited, readily furnished the Canadian Mining Journal with the following statement and resume:

### La Rose Consolidated Mines Company.

Production six months ending Nov. 30th, 1908.

|                                      | Tons.     | Ounces.   | Gr. value.      | Net value         |
|--------------------------------------|-----------|-----------|-----------------|-------------------|
|                                      |           |           |                 | f.o.b.<br>Cobalt. |
| Shipments. . . . .                   | 2,780     | 1,418,485 | \$718,543       | \$628,357         |
| On hand Nov 30. . . . .              | 99        | 72,978    | 35,613          | \$31,340          |
| Production. . . . .                  | 2,879     | 1,491,463 | \$754,156       | \$659,697         |
| <b>Operating Expense</b> , including |           |           | Per oz. silver. | Per ton.          |
| Development and all                  |           |           |                 |                   |
| charges except new                   |           |           |                 |                   |
| construction. . . . .                | \$106,063 | 7.11c     |                 | \$36.84           |
| <b>Marketing Expenses</b> , in-      |           |           |                 |                   |
| cluding Smelter de-                  |           |           |                 |                   |
| ductions, treatment,                 |           |           |                 |                   |
| and freight. . . . .                 | \$94,459  | 6.33c     |                 | \$32.81           |
| Total Expense . . . . .              | \$200,522 | 13.44c    |                 | \$69.65           |
| Operating Profit, 6 mos.             | \$533,634 |           |                 |                   |
| Construction Account ..              | \$7,148   |           |                 |                   |

The completion of the first six months work on the property of the La Rose Consolidated Mines Co., shows the following work accomplished up to November 30th:

|                               |                  |
|-------------------------------|------------------|
| Drifting. . . . .             | 1,957 feet.      |
| Cross-cutting. . . . .        | 555 feet.        |
| Raising and sinking . . . . . | 216 feet.        |
| Trenching. . . . .            | 8,181 feet.      |
| Open cutting . . . . .        | 99 Cubic yds.    |
| Stoping . . . . .             | 2,861 Cubic yds. |

The properties worked have been the La Rose, Princess, and the Violet; no work has been done on the Eplett, Fisher or Silver Hill claims.

On the main La Rose vein, much of the development has been done on the lower intermediate, between the first and second levels. The results have been much better than expected, and make one of the largest additions to the ore reserves since the property was taken over.

The first and second north winzes are 350 feet apart. Drifts were started from both winzes and there remains less than 100 feet to make connection.

All this drifting has been in good ore. One face is now in 3,000 ounce ore, the other in 2,000 ounce ore, and we are practically assured of a continuous ore

body 510 feet long on this level on the north side of the main shaft.

This is particularly gratifying as the showing on this level both in width and values is considerably better than it was on the first level above.

This lower intermediate level will be made the main drive for the exploration of the La Rose Extension claim though it will require 250 feet of drifting to reach the line.

At the north end of the first level the vein had split up into stringers; in the face of the level below, however, which is now a little farther north than the face of the first level, there is a solid nickel and cobalt vein 18 inches wide. This makes the outlook for the north half of the property exceedingly bright.

**No. 3 Vein.**—This vein crosses the main vein, and is opened up by a drift from the first level of the mine.

The stops above this level have shown the ore shoot to be more extensive than the outcrop indicated, and have yielded a good tonnage of first-class ore, which runs uniformly better than 3,000 ounces per ton.

A drift 60 feet from surface, starting from No. 3 raise, is being run east toward the big open cut; the ore is from 2½" to 4" wide, the last samples assaying from 4,900 to 6,700 ounces per ton.

No. 3 shaft sunk at the west end of the big open cut on the hill is 300 feet east of the No. 3 raise referred to above, and on the same vein.

The open cut is 42 feet deep. When it was found that the good ore continued strong in the bottom of this cut, it was decided to sink No. 3 shaft at least to the 100 foot level.

It is now down 65 feet, where the vein is two to three inches wide assaying 5,348 ounces per ton.

An important development has been recently made in the O'Brien No. 2 shaft, which is 200 feet from the south-east corner of the La Rose.

On the 160-ft. level, they have found a new vein 3" to 6" wide carrying much native silver in the calcite. This has been drifted onto within 5 feet of the La Rose line, so it is almost assured that this ore shoot will continue into our property.

It runs parallel to No. 3 vein, about 100 feet to the north. The important point about this is, that the ore occurs in the Keewatin, and at a point 100 feet deeper than our lowest workings on No. 3 vein. This would indicate that the stronger No. 3 vein will continue to be productive to at least the same depth. The recent development on both veins make this south-eastern corner of the property one of great promise.

**McDonald Vein.**—Some stoping has been done on this vein from the tunnel which penetrates the bluff 10 feet above the swamp level.



The ore in the top of the main stope was cut off by a flat fault, but a short cross-cut above the fault, picked up the vein again, where it proved better than it was below, assaying from 3,000 to 6,000 ounces.

In order to develop the McDonald vein at greater depth, a cross-cut was run from the first level of the main mine; this cut the vein 110 feet west of the mouth of the tunnel in the hill, and it has been drifted on for 90 feet. The vein is good, there being two stringers aggregating 3", the ore averaging between 2,000 and 3,000 ounces.

This work proves the vein 65 feet deeper than the hill tunnel, and will doubtless result in largely increased ore reserves on this vein.

**No. 10 Vein.**—When the new company began operations nothing had been done on this vein, although rich ore was in evidence on the outcrop. The estimates made at that time allowed a block 20 ft. x 30 ft. deep with a value of less than \$50,000.

A tunnel was driven into the hill, which cuts this vein 80 feet below the outcrop, and from the point of intersection a drift was run 80 feet on the vein to the Ferland-Chambers line.

The vein is good the whole distance, assaying better than 3,000 ounces over a width of three inches. Besides the high grade ore the country rock is good, the screenings from the broken ore running several hundred ounces per ton.

Up to November 30th this vein has produced \$41,854 worth of ore, and a block of ground 80 ft long x 80 ft. high has been opened up, compared with the estimated block 20 ft. x 30 ft. In addition to this, is the ore body below the tunnel, whose depth is as yet unknown.

**Development Work.**—Extensive exploration work is in progress throughout the mine. A cross-cut is being run lengthwise of the hill on the level of the swamp to cut several cross veins; a parallel cross-cut has been started from the first level of the mine and will run lengthwise of the swamp between the hill and the main vein; and another cross-cut starting at the south end of the mine runs toward the office to develop several veins outcropping near the south line.

About 250 men are employed, double the number at work last June.

New ore houses with shaking tables have been built at the McDonald tunnel, No. 10 tunnel, and at No. 3 shaft; also a new storage ore house on the railroad siding near the main shaft.

**Princess.**—Next to the La Rose proper, the Princess is the most promising holding of the Consolidated, lying, as it does, between the McKinley-Darragh and the Silver Queen, with veins from both sides running toward it.

During the last four months some 300 feet of drifting and cross-cutting has been done from the 50 foot level of the shaft.

Three veins have been developed, all of which carry high grade ore.

No stoping has been done, but over \$10,000 worth of ore has resulted from the development work.

The results have been so encouraging that a new 40-foot head frame, with ore house and picking tables, has been put up, and the shaft is now being sunk to the 100 foot level.

The Right of Way Co. owns a strip 99 feet wide between the Princess and the Silver Queen; on this they put down a shaft and cross-cut to the Silver Queen vein, on which they are now drifting toward the Princess line.

The vein carries six inches of good ore, and as their work is now close to our lines, it is almost certain that this vein will prove of considerable value in Princess ground.

**University.**—A small force has been employed on this property, taking out cobalt ore from an open cut, and in sinking a shaft on No. 4 vein.

The shaft is now down 50 feet, on a small vein 1" to 3" running about 3,000 ounces per ton.

A new headgear and ore house is being erected and the vein will be opened up for stoping.

**On the Violet** some trenching has been done, resulting in the finding of two veins carrying silver values, and I have great hopes of this ground when systematic mining operations are begun.

La Rose Mines, Limited,

R. B. WATSON,

General Manager.

## The Mill-Test for Gold versus The Assay.—A Comparison in the Methods for Non-Technical Men.

H. E. Haultain.

**"TWO AND A HALF TONS OF ORE FROM THE DUMP WERE PUT THROUGH THE MILL, AND YIELDED \$27.50 WORTH OF GOLD."** From a report.

The term mill-test is a time-honored phrase, and is associated in the minds of most miners with honesty and square dealing. It represents something tangible and reliable, something you can feel and see; whereas the assay has something of the hocus pocus about it; it savors of the ways of the alchemist and the mystery-man. The mill-test deals with a comparatively large amount, a ton or two, that you can appreciate in an ordinary everyday way, and it gives you the real stuff that is in the ore that you can handle and weigh on everyday scales. The assay deals with a spoonful, and

gives you a result that can hardly be seen without a glass and which weighs no more than so much dust on commercial scales.

Are two such methods that are so far apart in appearance near each other in results, and which is the more reliable?

In any test there are three sources of error: First, errors due to the limitations of the method and the appliances. Second, errors due to the carelessness or lack of skill of the man in charge. Third, errors due to intentional falsification by the man in charge or by others having access to the test.

In essential principles the mill-test and the assay test for gold in ore are remarkably similar. In each case the ore is first crushed to a fine sand. In the mill



the gold is separated from the sand by alloying the gold with mercury; in the assay by alloying it with molten lead. The gold is separated from the mercury by boiling off the mercury; from the lead by burning off the lead. In the mill the gold is alloyed with the mercury by flowing the crushed sand and water over copper plates coated with mercury. In the assay the sand and gold and suitable fluxes are all fused together with finely divided lead in a small crucible. With the best possible conditions and the most skilled attention the mill will catch only a part of the gold, this part being often less than 50 per cent. of the total gold contents and seldom more than 80 per cent. With ordinary care the crucible will catch practically all the gold; that is, more than 99 per cent. In the mill the mercury-coated plates must of necessity be used over again for different tests. It is impossible in ordinary work to remove all the amalgam (mercury and gold alloy) from these plates; the amount remaining on the plates depends on the skill and care of the manipulator. It is quite possible for some of the gold left on the plates from a preceding test to come off with the next test. The accuracy of the recovery of the gold from the plates depends on the skill and care of the man in charge. In the assay, clean crucibles are used, and the method is such that none of the gold remains behind. In the mill the ore is crushed in mortar box, in which are placed round steel dies. In and about these dies and in and about the corners and rough edges of the mortar box are crevices that will hold much gold. The very greatest care is needed before and after a test to clean out this box, and this cleaning out is a troublesome affair, and even under the best conditions cannot be thoroughly done. In the assay the ore is crushed by appliances specially designed to admit of perfect and easy cleaning, and the final crushing to sand is done on a perfectly smooth iron plate. From all this it will be evident that as far as the actual recovery of the gold is concerned the assay method is very much more accurate than the mill method. In general, if the mill-test is conducted under the best conditions with disinterested care, the result will show a value to the ore below the true value, but it is a very easy matter even when great care is exercised for the gold from one test to affect appreciably the results of succeeding test, especially if the succeeding test be on a low-grade ore. But the usefulness of the resulting gold in each case depends upon the accuracy of the weighing both of the ore treated and of the resulting gold. In the results, but the assayer has for his everyday use ball-mill-test ordinary balances will show fairly accurate ones that enable him to weigh a spoonful of ore with a smaller percentage of error than the mill scales weigh a ton, and he has still finer balances that will weigh his pin's-head of gold more accurately than the millman weighs his small brick. It is simply a question of apparatus, just as the mechanic with his hand micrometer will measure his lathe work to a thousandth part of an inch, while the mason will measure his wall only to the nearest inch. There is no question whatever that as far as the rock actually treated is concerned, the assay is very much more accurate than the mill-test. At first sight, however, the mill-test seems to have a very great advantage in that it handles a large quantity of ore, a ton or more, while the assay treats only an ounce, a small teaspoonful.

This is more a matter of appearances than anything else. The ton and the spoonful are each samples; the ton is only a very small amount compared with the

mine. The ton can be as misleading as the ounce. It is all a matter of sampling. And there is the crux of the whole matter; it is all a matter of sampling; and sampling is an art that has been reduced to a science.

In taking a sample there are two separate and distinct steps. The first is the taking of the sample from the mine, either from the solid unbroken ore or from the dump. This should invariably be of several pounds weight, and may run up into the tons. The second step is the drawing from this large sample of a small one which will accurately represent it. The two steps call for entirely different methods. The first one is by selection, and calls for trained experience, coupled with disinterestedness. This disinterestedness is essential. A foreman cannot sample his own mine, and for the same reason that a doctor will not operate on his own child. The second step is mainly a mechanical one, though it may be done largely by hand. It consists of crushing and mixing and "quartering," repeated until both the size of the largest particle and the size of the remaining sample have been very much reduced.

Everyday experience shows that with proper methods and proper care an ounce will accurately represent a carload.

All the ore sold to smelters (excepting the very richest) is sampled by sampling down the carload to a few ounces, of which less than an ounce may be taken for assay. It is a very common thing for shareholders or directors to ask for a "smelter test," thinking that they get an actual large-size test of their ore. In no case do they get it. Their ore is mixed with other ores long before it is smelted; what they get is a sampling and an assay.

There is, however, this much to be said in favor of the mill-test. Men inexperienced in sampling and honestly trying to learn the value of their prospect will probably get nearer the truth if they take a sample weighing a ton than if they take only a few pounds. But it must be remembered that if the sampler is the owner, or a foreman, it is (psychologically) a difficult thing for him to sample fairly if his mine or his vein is spotty, as most gold veins are, and it will be just as natural for him to get an excess of the better spots into his ton as into his few pounds.

If now, on the other hand, there is anything to be gained by high returns, the larger sample lends itself to salting at every turn. It must be handled by several men; it cannot be kept under constant supervision; it cannot be enclosed in puncture-proof cases. When it comes to the mill-test, if this is carried on in the ordinary mill to which the workmen and others have access, "salting" is the simplest matter. A handful of rich ore, even a spit of tobacco juice containing gold dust, will do the work.

Taken all round, the assay is much more reliable than the mill-test, but without proper sampling neither of them is of any value as a guide.

The art and science of sampling, and more particularly the sampling of ore in place, has been very much developed in the last ten years, and it has now taken its place in most mines of importance as a part of the regular routine work. All ore faces exposed in shafts, raises, drifts, and stopes are regularly sampled every few feet. If this is of value and importance in a regularly running mine, of how much greater importance is it in a new prospect, and if it can be done with sufficient accuracy to enable a man to control his monthly output by using it as a guide, assuredly it is suffi-



ciently accurate to be of prime importance in a partly explored ore body calling for capital. The ridiculing and belittling of the value and accuracy of proper sampling is the regular work of the wildcat promoter. It is a part of his stock-in-trade, on a par with the oft-repeated fiction of "increase in value with depth." To all men interested in mining ventures I say that all exposed faces of ore can be accurately sampled by a trained man without the taking of very large samples. I say further that a few pounds of properly taken samples will give much more reliable information concerning the true value of an ore body than several tons taken at random; and further, that the reducing of a ton sample of gold ore to a few pounds in weight by proper methods and the examining of this small sample in a laboratory will give much more information and more reliable information than a mill-test of the whole ton of ore.

Whence comes, then, this veneration for the mill-test? This is not hard to find. Its value developed in the days when there was no cyaniding or chlorination or smelting, when there was nothing but amalgamation, and what the mill failed to recover was no better than valueless. The question was not "how much gold is there in it," but "how much will the mill save." But

in these days, with advanced methods some means can always be devised for the recovery of most of the gold, and the right question is "how much gold is there in the ore?" and this the ordinary assay determines more accurately than any other method.

In the August 15th, 1908, issue of this magazine I said: "There is not a property in the Larder Lake District upon which sufficient work has been done to justify the presence of a mill, not even of the small three-stamp, so-called, prospecting mill."

These mills were put up for one of two reasons, either to test the ore bodies or else to sell stock. Thirty years ago it might have been justifiable to put up a very small mill to test an ore body, but nowadays the trained mining engineer will get more accurate results than the mill, and at a small fraction of the cost. A fee of \$1,000 and the costs of sampling and assaying will give better information than \$20,000 spent on a mill. But—and here I speak quite seriously—the engineer's results cannot be controlled by the promoter, and naturally, if the purpose is to sell stock, a mill-test on more or less selected ore will be much more efficient for newspaper talk than the cold-blooded facts of the engineer.

## EARLY DAYS IN COBALT.

BY W. G. TRETHERWEY.

It was during the winter and spring of 1904 when my friend, Dr. Milton Hersey, of Montreal, brought to my attention the fact that silver had been found up in the wilds of Nipissing, west of Lake Temiskaming.

Dr. Hersey's observations were that the samples were wonderful, but native silver had, as a rule, proved freakish and unreliable, but that, however, the discovery was worth investigating.

My mind was made up to visit this new country as soon as navigation was open on the Ottawa River and on Temiskaming Lake. On parting with Dr. Hersey I told him that I would inform him of the results of my visit and give him what advice I could as to the prospects in the new country.

To better investigate the finds in the north I decided to settle my family in Toronto for a time. From Toronto I could equip myself with full information as to the mining laws of Ontario, etc. At the Parliament Buildings I was shown every courtesy, and met there some of the men who have made Ontario's Bureau of Mines a credit to the Dominion.

Having ascertained that the ice was clear, I gathered my camp outfit and left Toronto for the north on the 16th day of May, none too late, as patches of snow and ice lay all about after Temiskaming was reached. In those, what appear now, distant days we had to travel to North Bay by G. T. R., thence to Mattawa by the C. R. R. main line, and to Temiskaming by short line, and by boat to Haileybury, then a hamlet of a few houses, a store, a postoffice, and one hotel.

Since that memorable trip it has often occurred to the writer that fortune was certainly on his trail. After leaving Toronto no familiar face appeared. At North Bay the day of my arrival had seen an important event—the sitting of court—and all hotels were filled, and not a bed was to be had. After considerable prospecting, however, I found a man who offered to furnish

a place to sleep, and to this day I think it was the apartment of his daughters. It has often occurred to me that I owed this man substantial thanks, for it was this night's rest that fitted me for what was ahead. Next morning, bright and early, I took train for Mattawa, and thence the short line to Temiskaming Landing, where the boat was waiting to convey the many passengers north, some to the new silver fields (for a few had scented fortune afar off), but more to the backwoods settlements beyond New Liskeard.

In all my tramps abroad it has been my practice to carry a good pair of field glasses. These I was using liberally, examining the shores of the Upper Ottawa, trying to read the different formations, when a bronzed and rugged pioneer with interested and penetrating look upon his face, stepped forward and said: "Are you a mining man?"

I replied that although I was not an expert or engineer, I had mined and prospected to a considerable extent, and that I had heard wonderful stories of a country ahead. He looked hard at me for some moments, and seemed to be trying to read my thoughts. Then suddenly appearing satisfied with his scrutiny, he said, pulling and tugging at something, jagged and irregular, in a lumberman's woollen sock, which had been fished up from the depths of his overcoat pocket, "What do you think of that? What is it?"

The magnificent specimen of silver now held up before my eyes spoke more forcibly than any words could do that I was indeed on "treasure's trail." In it I recognized a piece of almost pure native silver larger than I had ever seen before, as a sample, and it told a story of hidden wealth far beyond anything I had pictured.

This man's name was McKinley, one of the original discoverers of the now famous McKinley-Darragh mine. He assured the writer that he found that piece



# COMING ATTRACTION

## BOXING FORUM

THURSDAY, NOVEMBER 8th at 8.30

JOE DUNN vs HENRI AUGER, Montreal  
WELTERWEIGHT — 5 ROUNDS

HENRI PILOTTE, Montreal vs GORDON ROWAN, Montreal  
LIGHTWEIGHT — 5 ROUNDS

### WORLD'S BANTAMWEIGHT CHAMPIONSHIP TOURNAMENT

JO TEI KEN, Japan vs BABY QUINTANA, Panama  
10 ROUNDS

EUGENE HUAT, France vs NAT LIFTIN, Pittsburg  
10 ROUNDS

FRANKIE MARTIN, Montreal vs "LEFTY" GUEYNNE, Toronto  
10 ROUNDS

NO DRAWS — IF JUDGES DISAGREE 2 EXTRA ROUNDS

TICKETS: 75c — 1.00 — 1.25 — 1.50 — 2.00 — 3.00 (Plus Tax)

### SENIOR GROUP, C.A.H.A. - SCHEDULE

|           |          |                          |          |                        |           |          |                           |          |                        |
|-----------|----------|--------------------------|----------|------------------------|-----------|----------|---------------------------|----------|------------------------|
| Saturday  | November | 3—Royals<br>Verdun       | vs<br>vs | Canadien<br>McGill     | Sunday    | December | 16—Canadien<br>Royals     | vs<br>vs | Lafontaine<br>Verdun   |
| Wednesday | "        | 7—Lafontaine<br>Canadien | vs<br>vs | Royals<br>Verdun       | Wednesday | "        | 19—Royals<br>Canadien     | vs<br>vs | Victoria<br>McGill     |
| Saturday  | "        | 10—Victoria              | vs       | Ottawa                 | Sunday    | January  | 6—Ottawa<br>Canadien      | vs<br>vs | Lafontaine<br>Royals   |
| Sunday    | "        | 11—Royals<br>Ottawa      | vs<br>vs | Verdun<br>Lafontaine   | Wednesday | "        | 9—Victoria<br>Royals      | vs<br>vs | Verdun<br>Lafontaine   |
| Wednesday | "        | 14—McGill<br>Victoria    | vs<br>vs | Canadien<br>Lafontaine | Saturday  | "        | 12—Verdun                 | vs       | Ottawa                 |
| Saturday  | "        | 17—Royals                | vs       | Ottawa                 | Sunday    | "        | 13—Canadien<br>Lafontaine | vs<br>vs | Verdun<br>Royals       |
| Sunday    | "        | 18—Lafontaine<br>Ottawa  | vs<br>vs | Verdun<br>Canadien     | Wednesday | "        | 16—Ottawa<br>Verdun       | vs<br>vs | McGill<br>Victoria     |
| Wednesday | "        | 21—McGill<br>Royals      | vs<br>vs | Lafontaine<br>Victoria | Saturday  | "        | 19—Lafontaine             | vs       | Ottawa                 |
| Saturday  | "        | 24—Lafontaine            | vs       | Ottawa                 | Sunday    | "        | 20—Royals<br>Verdun       | vs<br>vs | Canadien<br>Lafontaine |
| Sunday    | "        | 25—Verdun<br>Canadien    | vs<br>vs | Royals<br>Lafontaine   | Wednesday | "        | 23—Royals<br>Verdun       | vs<br>vs | McGill<br>Canadien     |
| Wednesday | "        | 28—Canadien<br>Verdun    | vs<br>vs | Victoria<br>Lafontaine | Saturday  | "        | 26—Canadien               | vs       | Ottawa                 |
| Saturday  | December | 1—McGill                 | vs       | Ottawa                 | Sunday    | "        | 27—Ottawa<br>Lafontaine   | vs<br>vs | Verdun<br>Canadien     |
| Sunday    | "        | 2—Lafontaine<br>Ottawa   | vs<br>vs | Canadien<br>Verdun     | Wednesday | "        | 30—Ottawa<br>McGill       | vs<br>vs | Royals<br>Victoria     |
| Wednesday | "        | 5—Ottawa<br>Royals       | vs<br>vs | Victoria<br>McGill     | Saturday  | February | 2—Verdun                  | vs       | Ottawa                 |
| Saturday  | "        | 8—Canadien               | vs       | Ottawa                 | Sunday    | "        | 3—Lafontaine<br>Canadien  | vs<br>vs | Verdun<br>Royals       |
| Sunday    | "        | 9—Verdun<br>Ottawa       | vs<br>vs | Canadien<br>Royals     | Wednesday | "        | 6—Victoria<br>Verdun      | vs<br>vs | Lafontaine<br>McGill   |
| Wednesday | "        | 12—McGill<br>Victoria    | vs<br>vs | Lafontaine<br>Canadien | Sunday    | "        | 10—Ottawa<br>Royals       | vs<br>vs | Canadien<br>Lafontaine |
| Saturday  | "        | 15—Royals                | vs       | Ottawa                 | Wednesday | "        | 13—Verdun<br>McGill       | vs<br>vs | Royals<br>Victoria     |

## CANADIENS SENIORS

| No. | Name           | Position   |
|-----|----------------|------------|
| 1.  | E. Archambault | Goal       |
| 2.  | P. E. Arcand   | Defence    |
| 3.  | J. Wilson      | Defence    |
| 4.  | Armand Raymond | Defence    |
| 16. | Tom. Shore     | Defence    |
| 6.  | A. Burnie      | Left Wing  |
| 7.  | P. Martin      | Center     |
| 8.  | G. Poirier     | Center     |
| 9.  | L. Pilon       | Center     |
| 10. | D. Bissell     | Right Wing |
| 11. | F. Ranger      | Left Wing  |
| 12. | R. Robert      | Left Wing  |
| 14. | F. Blanchard   | Center     |
| 15. | M. Raymond     | Defence    |

V.S.

## VERDUN HOCKEY CLUB

| No. | Name          | Position   |
|-----|---------------|------------|
| 1.  | G. Martel     | Goal       |
| 2.  | L. Brunet     | Defence    |
| 3.  | J. Griffin    | Defence    |
| 4.  | J. Kilby      | Center     |
| 5.  | C. Ethier     | Right Wing |
| 6.  | J. Bourcier   | Left Wing  |
| 7.  | M. Martel     | Center     |
| 8.  | G. Brown      | Left Wing  |
| 9.  | L. Lafontaine | Right Wing |
| 10. | W. Trudeau    | Left Wing  |
| 11. | H. Lee        | Defence    |

Les partisans du groupe amateur senior ayant assisté à neuf matchs auront l'avantage de retenir leurs places pour les parties de détail sur présentation de leurs neuf talons au Bureau de Contrôle du Forum.



lying loose in the gravel by the shore of a small lake; that he and his partner had staked the ground, and hoped to find more.

My desire was to see the place where this specimen came from, and I pressed my new-found friend to show me, which he kindly agreed to do. That night, the 18th of May, we landed after dark at Haileybury, and in spite of the electric lights of the town not being in commission, I managed to find a place to sleep, thanks partly to Mr. McKinley. The following morning being fine, we, as the saying is, "hiked it" over perhaps the roughest trail to what was to be the new silver camp, at that time known as Long Lake (now changed to Cobalt).

Mr. McKinley first took the writer to his claim, and there I had my first experience in washing silver nuggets from the gravel and dirt of the Cobalt Lake shore.

Mr. McKinley did not seem to realize that beneath the debris somewhere there must be a vein hidden, and I suggested to him to start a cross-trench from the water's edge toward the hill, and thus, if possible, cross-cut the vein. This was done, and the vein found from which these rich specimens had come.

From this property we went to see the "Little Silver" vein, as it was called, and there I saw more silver than I had ever dreamed of. From here we visited Cobalt Hill, and the now splendid La Rose mine, which at that time, was a mere discovery, and what a western man would term a prospect.

After ascertaining that no properties were for sale in the new camp, I made up my mind to pitch my tent at Long Lake and prospect. It had rained heavily on the 20th, and it was the evening of the 21st before my camp was put in order, on the ground where now stands the Right of Way shaft-house.

On the 22nd my efforts were in a southerly direction, but I met with stakes and lines on every hand, and I came back to camp determined to try in a new direction on the morrow. This, the 23rd of May, 1904, was an eventful day for me. During all the forenoon and well into the afternoon the day was taken up in working towards the southwest along the chain of small lakes toward and round Pickerel Lake. The formation here I did not fancy, and at 2 p.m. I returned to camp weary and hungry. My man at camp understood the art of cooking bacon and eggs, and after a good lunch and a rest, it being now 4 p.m., I decided to finish the day searching for the silver trail in a quite opposite direction—northwest—a direction I had been assured was out of the mineralized zone. From my camp I headed straight across ridges, over bluffs, and through thick brush and swamp until I came over the bluff west of where the old Trethewey plant now stands. Perhaps it was intuition, or perhaps it was the mere fancy that I had gone far enough to get beyond the zone of stakes and lines of other claims, but here I stopped to examine the rock, in which I recognized the same characteristics I had observed near the veins already discovered in the camp. And I said, mentally, "This is good-looking formation," and at once I decided to follow it along the ridge south. As examination proceeded along the bluff it was evident that other fortune-hunters had been there, but I detected, as I thought, a want of experience by reason of the green moss having been disturbed, and an absence of the evidence of digging in the crevices and cracks, where the silver is usually found. As the bluff was traversed I noticed an almost natural opening or pathway over one portion of the bluff, which at this point jutted out into a swamp.

The other prospectors had evidently taken this easier way. The point, from the swamp side, was covered with fallen trees, underneath which there was room for one to pass round the point of the bluff by wading in the water. The writer was after silver, and a little water or brush had no terrors for him, and beneath these windfalls he was determined to examine. And there beneath this Nature's covering was Nature's prizes. The thing that men work and sweat and hope for—silver in abundance!

It was now 5 p.m., and I was in an unknown forest at least a mile from camp, without any tool but a prospector's pick; and I realized that camp must be reached and an axe brought back for the proper staking of the new find. In the meantime another prospector might come and make the discovery of the presence of silver, in which case the discovery might be lost, as the first discovery post would probably hold the ground. Therefore, I lost no time in returning to camp, and as there was a company of other prospectors sitting round my fire having tea, it was best that I should act rationally and take refreshments as if a mine did not exist for me. All the time I was planning how I might move off with my axe without arousing suspicion that something was doing. After tea I said to my man, in the hearing of all, "I am going over here to cut a particular tree down that I saw, and will return shortly." I passed from camp as if I were on the most trivial errand; but when out of sight the high places were only touched, and in a few minutes I was there to see if someone had discovered my prize. All was well, and no time was lost in erecting a stake on the vein and inscribing date and name thereon. Also a witness tree was treated likewise, after which I had a little time to breathe and look around. It was becoming dark now, and a move for camp was made, which this time was more southerly, further along the bluff. Now, fully imbued with the idea that mineral might be found anywhere, my scrutiny was close as I passed along, and, sure enough, at about 200 feet distance from the first find, which is now the Trethewey mine, the first vein on the Coniagas was discovered. I did not secure a sample from the last find that evening, as it was almost dark, but I left for camp with the absolute confidence that it was there, from the indications I had seen.

I had heard stories about a syndicate that owned all the ground round for miles, and that night I was turning it over in my mind and wondering if it were true, and if my finds would, after all, be taken away. I carefully consulted the Mines Act, and from it decided that I would get the ground, providing the Mines Department lived up to the law. Prof. W. G. Miller (now Dr. Miller) had arrived in the country a few days previous to my discovery, and was camped on the La Rose property at this time. There I repaired, and I anxiously asked him if it was the intention of the Department to enforce the Act, and on receiving an affirmative reply, I told him of my discovery, and the following morning we repaired to the spot, the Professor's assistant, Mr. C. Knight, accompanying us. Dr. Miller was almost a total stranger to me at this time, and from the amused twinkle in his eye when I told him of my hidden millions (before he had seen for himself), it was evident that he had been filled up with prospectors' yarns before. On arriving on the ground, however, his manner became serious, and it was evident he was pleased at the new finds.

Mr. Alex. Longwell, prospecting for Mr. R. W. Leonard, was at my camp and sharing my awning for



dining-room at this time. I asked him to help me measure off the Coniagas—known as J. B. 6 lot—and Trethewey—J. B. 7. For this he and Mr. Leonard became part owners in the former claim. After all staking had been completed I returned to Toronto to have the titles properly attended to. This took considerable time, and it was about the middle of July before the writer received permission from the Department to go on and prospect the Trethewey property.

Things were indeed crude and slow in those early days of Cobalt's development. To get in powder we had to almost beg the officers of the transportation company to carry us small shipments. And \$32 was paid for one box of giant powder at Haileybury. From there in, the road was so bad that it cost a dollar a box to get it to the mines. Our teamster usually loaded up with liquid combustibles, so, he said, if the powder went up going over the jolts, neither he nor his team would know when it happened. Those were the good old days—the summer of 1904—when we were not bothered with specimen hunters, and we were busy digging out the beautiful metal. On Sundays we were rarely disturbed at our bathing in front of the town of Cobalt, for ladies were seldom seen in those parts. Such a thing as stock selling and mining the public, a widely practised art now, was not dreamed of. We were happy; but when returning to civilization with pockets stuffed with nuggets and stories of the great wealth of that land, our experienced mining friends would look with a sort of pity, as if to imply, "I wonder how long before the dream will end?" or "He is not long to remain with us. Mimico will be his portion soon."

This apathy and extreme inattention to Cobalt's importance got a sudden jolt when news came from New York that cheques ranging up to tidy fortunes were being paid for single cars of ore.

The crowd has now gone just as batty in the opposite direction. From a people that nothing could move in 1904, we now have what the world seldom sees—a mad, clamoring crowd buying everything in the form of a Cobalt stock, the end of which spells disaster for many.

The writer had the honor of grading, at his own expense, for the first switch and siding at Cobalt on the T. & N. O. R., and landed the first car of machinery—a boiler, a hoist, and an electric light plant.

I could go on enumerating incidents of Cobalt's early days, but I feel, Mr. Editor, that a good earnest apology is more in order for the space already occupied by this rambling reminiscence. A lesson Cobalt has taught me is that poverty and riches bring out human nature either in its beauty or in its most contemptible form; by them you will know your true friends.

W. G. TRETHEWEY.

### TRETHEWEY MINE.

The Editor, Canadian Mining Journal,

Confederation Life Building, Toronto.

Dear Sir,—In response to your request, I have much pleasure in giving you a synopsis of the operations conducted at the Trethewey Mine up to the present date.

The property is situated on Sassaginata Lake, just outside the town limits of Cobalt, and lies between the Coniagas Mine on the south, and the Temiskaming & Hudson Bay Mine on the north, and marches with one of the locations of the Nipissing Mining Company on the east.

The development work to date has been principally conducted at the south-east end of the property, close to the Coniagas and Nipissing boundary lines.

There are three working shafts on the property, measuring in all over 400 ft., with upraises of over 100 ft.

No. 1 and No. 2 Shafts, approximately 650 ft. apart, are connected by a drift on vein "F" at the first or fifty-foot level.

No. 2 and No. 3 Shafts, a distance of about 110 ft. apart, are connected at the second level, which is 140 ft. below the collar of No. 2 Shaft. No. 3 Shaft has been sunk to a depth of about 200 ft., where a third level is being run east to the Nipissing boundary and west towards No. 2 shaft. The total amount of drifting and cross-cutting in these workings is about 4,000 ft.

Several thousand feet of surface work has been done, consisting of trenching and "open cutting," and several prospecting shafts have been sunk on veins and fissures occurring towards the north end of the property. Owing to the geological conditions there existing, these operations have failed to disclose any ore bodies of economic value, it having been recently proved that the veins at the north end (with one exception, namely the discovery vein on the Temiskaming & Hudson Bay location) do not carry values until considerable depth is reached. This has been recently demonstrated by a tunnel which was run from the workings of the Temiskaming & Hudson Bay property at their 100 ft. level, towards and across the Trethewey north line, where an important body of rich silver ore was encountered at that depth.

Prospecting operations by the diamond drill were also conducted during the past year, the result of which was to locate some valuable veins at depth, and by means of which important geological information was gained.

The system of treating ores for shipment obtaining at the mine is now confined to crushing and hand sorting, followed by partial concentration in a double compartment Hartz jig, to which is being added a belt conveyor and coarse concentrating table to handle the hutch product from the jig. The present operation is so satisfactory that only very low grade ore is being sent to the dump for future treatment. By this means the grade of ore formerly shipped as screenings (running from 100 to 200 oz. per ton and carrying about 70 per cent. of country rock, on which in some instances a heavy penalty was exacted by the smelters) is made to produce a high-grade product, running from 1,500 to 2,000 oz. per ton, thus saving a very heavy expenditure for freight and treatment charges on the bulk of the ore formerly shipped.

As the development work proceeds, the production of ore is increasing, and during the past few months the output represents a net return of over 25 per cent. on the capital of the company, notwithstanding the present low price of silver.

The new ground recently developed by the lower workings is producing ore of high grade equal to the best in the history of the mine, and the large reserves of ore being opened up warrant the belief that the mine has a very promising future before it.

Yours faithfully,

ALEX. M. HAY.

### THE RETIRING TREASURER OF THE CANADIAN MINING INSTITUTE.

After holding the office of Treasurer of the Canadian Mining Institute for ten consecutive years, Mr. J. Stevenson Brown has tendered his resignation. In the early days of the Institute the work of the treasurer-



ship was comparatively light. During the last few years, and especially during the year that has just closed, the enormously increased membership has entailed a correspondingly greater bulk of work upon the treasurer. In addition to collecting and handling the annual fees of each member and controlling the disbursements of the Institute, the disposal of large governmental appropriations has fallen upon his shoulders.

whose chief object and aims were centred in fostering and developing the mineral resources of the Dominion.

"At that time there was, comparatively speaking, but a handful of members, led by that enthusiast of sacred memory, the late B. T. A. Bell, the founder and organizer of the Canadian Mining Institute, and its indefatigable secretary. And surrounded by such men as were attracted to the Institute, mainly through his



MR. J. STEVERSON BROWN, RETIRING TREASURER OF THE CANADIAN MINING INSTITUTE.

Hence it is evident that the position is at present no sinecure.

The following extracts from a recent letter of Mr. Brown's are most pertinent and interesting. We can hardly do better than quote Mr. Brown's own words:—

"I joined the Institute at its inception in 1898, associating myself with a number of men, who recognized that there was a great field for an organization

wonderful personality, it is not surprising that the organization has made a steady march in the direction of progress and that the influence of this man's work should be stamped on almost every page of the Institute's history.

"Working hand in hand with the late Mr. Bell, and closely identified with the early history of the Institute, were John E. Hardman, George E. Drummond, A. W.

Stevenson, George R. Smith, Charles Fergie, Major R. G. Leckie, John B. Hobson, besides several others who have passed beyond the great divide, such as the late lamented Dr. Geo. M. Dawson, James F. Lewis, Roderick Robertson and John Blue. These men were all zealous and enthusiastic workers in the affairs of the Institute in its early days—men of character and ability, indeed I may say of authority, in their respective fields of work.

"At the end of the first year there was a membership of upwards of 150. It was then, on the resignation of Mr. A. W. Stevenson, who was the first Treasurer of the Institute, and at the solicitation of such men as I have mentioned, that I became a candidate for the office so made vacant, and was elected by acclamation.

"Year by year the Institute has continued to grow, until now there are close upon 700 names on the membership roll, not including student members.

"Lack of time prevents me going more into detail. Were it not for that, I could say a good deal about the

difficulties we had to contend with at the start. Bell, of course, was the leading spirit, and his wishes generally carried, often for the reason that he had at command such a flow of language and such an array of proof based on authorities that he could quote by the yard and pour forth in such a whirlwind of enthusiasm that few could face. And be it said to his credit, his plans and convictions were usually right."

Since those early days, upon which Mr. Brown touches so vividly, the Institute has had the full benefit of his continuous services, and his ripening experience. He has now, forced by the demands of his private affairs, decided to resign the office that he has filled honorably and well for ten years. This will not, we hope, mean that Mr. Brown is to sever altogether his connection with the Canadian Mining Institute. We shall still expect to see his cheerful countenance, hear his tales of the heroic days, and listen to his inimitable renderings of Dr. Drummond's poems.

## THE AGAUNICO MINES DEVELOPMENT CO.

We have been requested by Mr. E. L. Fralick, mining engineer to the Cobalt Lake Mining Company, Limited, to give publicity to the following correspondence.

The Agaunico Mines Development Company is incorporated under the laws of Arizona, with a capital of \$500,000. The mine on which this capitalization is based is situated on the shore of Lake Temiskaming. It has produced no silver. It has produced a few tons of high-grade cobalt ore, for which there is a very limited market.

This property was one of the first exploited in the district. The original owners were prominent and capable mining men. The property was thoroughly prospected.

The prospectus is a phosphorescent mass of falsehoods. One S. W. Gilbert describes the property as "a reservoir of solid silver." Mr. Gilbert needs classification by President Roosevelt. Other equally absurd features distinguish this precious prospectus.

When the property was first acquired, and before the prospectus was issued, Mr. E. L. Fralick states that he consented to advise the company as to selection and installation of machinery. He stipulated expressly that his responsibility ended there.

When the prospectus appeared Mr. Fralick immediately protested against the use of his name. The following letters speak for themselves. Mr. Fralick has put the matter in the hands of his attorney:—

Nov. 25, 1908.

E. I. Rosenfeld, Esq.,  
Tacoma Bldg., Chicago, Ill.

Dear Sir,—Enclosed please find copy of letter to Mr. E. J. Bestick, which explains itself.

Yesterday I received a copy of the prospectus of the Agaunico Mines Development Company, in which I am mentioned among the officers as consulting engineer. When I consented to advise regarding the plant and equipment, it was agreed and understood with both yourself and Mr. Martin, that my services ended there. It was explicitly stated by yourself and Mr. Martin that my services were not desired as consulting engi-

neer, but merely to advise regarding the plant. It was definitely agreed and understood that there my responsibility ceased, and that I had nothing whatsoever to do with the mine or the planning of the work.

To-day I am informed that my name is being used on the letter-heads of the Agaunico Mines Development Company. This is also entirely unwarranted and unauthorized by me. I have merely acted in the capacity of consulting master mechanic, something entirely different from that of consulting engineer.

I gave no permission for the use of any letter of mine in the prospectus. A letter which I wrote has been slightly changed and letters tacked on to the end of my name, which are not the proper designation of my degree.

I therefore insist that my name must be eliminated from any prospectus, letter-head or other literature emanating from your office, or in any way connected with the Agaunico Mines Development Company.

I shall await the receipt of satisfactory assurance that this will be done by return mail. I am,

Yours truly,  
(Sgd.) E. L. FRALICK.

(Note.—The following is an answer from Mr. Fralick to an enquiry concerning the Agaunico).

Nov. 25, 1908.

Mr. E. J. Bestick,  
Detroit, Mich.

Dear Sir,—Your letter of the 12th, asking my opinion as to the prospects of the Agaunico Mines Development Company, received. It is not usual for me to comply with such requests, except in the form of a report after due examination. The use of my name, however, by the Agaunico Mines Development Company necessitates this departure.

From my own personal knowledge, I know absolutely nothing of the underground workings of the mine. I have, however, frequently heard competent and reliable men familiar with the mine state that there was in sight there a larger body of high-grade cobalt ore than in any other property in the district.



I am familiar with the work done there in the last couple of weeks. It appears to have been prosecuted in a vigorous and competent manner. Further than this, I know absolutely nothing of the prospects of the Agaunico Development Company.

Yesterday I received a copy of the prospectus of this company, and noted that I am put on its list of officers as consulting engineer. I am not now and never have been the consulting engineer of the Agaunico Mines Development Company. The use of my name is entirely unwarranted, and I am taking the necessary steps to have it stopped.

Nov. 30th, 1908.

Mr. E. L. Fralick,  
c/o Cobalt Lake Mining Company,  
Cobalt, Ont.

Dear Sir,—I am in due receipt of your letter of the 25th inst., and have delayed a few days in answering, as I did not wish to be hasty.

I am frank to say that I have never in my thirty years' business experience been subjected to such unqualified impertinence. Your statements are absolutely without warrant. There is only one of them that is right, and that is that you are not connected with the Agaunico Mines Development Company, and that is right because from the time your letter was received it is needless to say that the Agaunico Mines Development Company would not permit you to be.

I made a definite and unqualified arrangement with you to act as consulting engineer, in the presence of Mr. Martin, the president of the Agaunico Mines Development Company, and you have been rendering some services, but none commensurate with what I supposed your abilities were, or what you were paid to do.

Mr. Whitson assures me, without qualification, that the letter he asked you to write was for the purpose of being embodied in the prospectus, and I know Mr. Whitson well enough to know that he does not make any statements which are not true. Unfortunately, on such matter as we have your name it cannot be taken off, excepting to erase same on such matter as is sent out from our office. This we will take great pleasure in doing. As a matter of fact, you owe both Mr. Martin and myself an apology.

I am sending a copy of this letter to Mr. Bestick for his better information.

Referring to the criticism about the letters "E. M." after your name, beg to say that you yourself told me that you were a mining engineer and a university graduate with that degree. I supposed you were telling the truth.

Yours very truly,

E. I. ROSENFELD,  
President.

P.S.—You will please turn over either to Mr. Rochester or Mr. Martin any such correspondence as you may receive with reference to the Agaunico Mines Development Company.

Haileybury, Ont., Dec. 2nd, 1908.

Mr. E. L. Fralick,  
Cobalt, Ont.

Dear Sir,—I am in receipt of your letter of Nov. 26th, with a copy of one to Mr. E. J. Bestick, Detroit, Minn., and Mr. E. I. Rosenfeld, Chicago, Ill.

Your request that your resignation be accepted, to take effect at once, will be cheerfully granted on one condition, that you retract the last paragraph of your letter to Mr. Bestick, and acknowledge to him that you were retained by the Agaunico Mines Development Company as consulting engineer, to select and see to the proper installing of their machinery, and to direct their underground work, but was at no time to be asked to say where this work might be done.

These are absolutely the duties you undertook to perform, and was paid for, and we had the same right to use your name as we have that of any laborer on our pay roll. Your claim to have been hired to act in the capacity of consulting master mechanic is entirely erroneous, and I doubt very much your right to that title.

I am making this condition with prejudice, and hope you will accept it, before may become necessary to repeat it.

Yours truly,  
(Sgd.) D. K. MARTIN,  
President.

## THE CHROME IRON MINES.

(Special Correspondence.)

Owing to the constantly increasing demand for Canadian chrome iron for the last two years or so operations were carried on more with a view to developing thoroughly the known resources than to prospect or search for new deposits. The principal, and to-day the only company working in the district, is the Black Lake Chrome Asbestos Co. This company has done more for the development of the chrome industry than any other, and it may here be said that the success of the competition of the Canadian article with foreign ores, especially with those from New Caledonia, is solely due to the untiring and energetic efforts of this concern. The presence of silica in chromic iron beyond a four per cent. limit excluded the Canadian ore for a number of years from its application to furnace linings; but to-day ores containing eight and ten per cent. are successfully used for that purpose. This change has greatly stimulated the demand for Canadian ore, so much so, that for the last two years the requirements on the part of United States manufacturers could not be fulfilled. The Black Lake Chrome Asbestos Co. owns most of the productive chrome properties in the Eastern Townships of Quebec, and produces at present almost the whole Canadian output. Two pits are in operation: No. 1 is located not far from the railroad track, about two miles from Black Lake, and consists of an inclined (65°) shaft 400 feet deep. This shaft is in solid crude ore, and it is reported that it delivers mostly all crude high grade ore. The company has spared no money or means to find out the extent of the deposit, both as to depth and lateral extension, by diamond drilling. The mill is located close to the track of the Quebec Central Railway, and consists of 30 stamps, jaw crushers, and 5 Wilfley tables.

The other mine, known as the "Montreal Mine," is located on lot 26, range 11, Coleraine, at a distance of 7½ miles from Chrome Siding, to the east of the railway. It was taken over by the Black Lake Chrome and Asbestos Co. in 1906, and since that time development work has been pushed to an extent that leaves no



doubt as to the very large quantities of chrome ore available at this mine. The mill consists of 15 stamps, jaw crushers, and three Wilfley tables. The production of chromite for 1907 had a value of \$72,901, whereas the value of 1901 reached the sum of only \$25,444.

#### Asbestos Mines.

The asbestos mines in the Eastern Townships of Quebec constitute one of the successful industries of the Dominion. While in the year 1904 altogether ten mills, with a total milling capacity of 3,500 tons per day were in operation, last year (1908) there were 13 mines and mills with a total capacity of 6,000 tons working, and there are in addition at the present time under construction four more mills with a total milling capacity of 1,500 tons. The great advance in the development of this industry may be seen from the following figures:—

|               | Production. | Value.      |
|---------------|-------------|-------------|
| 1904. . . . . | 35,479      | \$1,199,919 |
| 1907. . . . . | 61,985      | 2,483,211   |

In other words, in three years the production increased 75 per cent. and the value of this production over 100 per cent. This great increase is principally due to the great demand for the last number of years from the United States and Europe, and in consequence thereof the old establishments increased largely their mill capacity, and new mines sprang up.

Of special interest in the asbestos industry is the activity which is being displayed at present in the Broughton district. The first mill, that of the Broughton Asbestos Co., was built in 1903. In 1904 the Quebec Asbestos Company followed, and in 1908 the mills of the Eastern Townships Asbestos Company and the Boston Asbestos Company were built, while the big 500 ton mill of the Frontenac is still under construction. It has been shown through recent investigations by Mr. Fritz Cirkel, M.E., of Montreal, that the Broughton asbestos range commences in the third range, and is to be found on every lot numbered 13 of the different ranges of Broughton township, extending right into and through the township of Thetford, and joining the famous rich asbestos-knoll at Thetford village. Commencing with the easterly discoveries, the Cliche asbestos outcrops on lot 13, range 111, we have altogether 13 locations, and working mines, and it is probable that this number may be increased through new discoveries in the near future.

While it must be admitted that for the last six months the asbestos market was very sluggish as a direct result of the financial depression of a year ago, there is now a decided improvement and it is confidently expected that the next year will bring a further favorable change in the situation. It is acknowledged that Canada supplies 90 per cent. of the world's production of asbestos; new discoveries in foreign countries are being made every year, but so far they have failed to enter into serious competition with the Canadian article. The future outlook of the asbestos industry is very encouraging indeed and prompted by the constantly growing number of commercial uses, the industry keeps steady pace with the demands made upon it.

#### THE WORK OF THE KINGSTON SCHOOL OF MINING.

Since its inception in 1893 the work of this school has been of unusually direct benefit to our mining and

metallurgical industries. The short courses for prospectors inaugurated the first session did much to stimulate interest in minerals and their discovery. There followed immediately the summer mining classes, afterwards taken up and extended by the Ontario Bureau of Mines. In 1894 the first mining laboratory erected in Canada was built at the School of Mining, and it immediately became useful to the mining industry. Ores from all parts of Canada were treated for value and process, and this work has become of such importance that the laboratory is now kept open all the year round. When corundum was discovered in Ontario, Professor Miller, then of the School of Mining, was given the task of prospecting the field to ascertain its extent and value. Twenty tons of the ore were treated in the mining laboratory, and a method of concentration worked out. The quality of the corundum was examined, and a method for analysis of corundum and ore was found. The industry, which was later established at Craigmont, Ont., was based largely upon this work. A later example of the value of the mining laboratory to Ontario is seen in the extensive use made of its staff and equipment by Cobalt mine owners. We must add to this that the first Canadian process for refining Cobalt ores was there worked out by Professor S. F. Kirkpatrick. This process is now in operation at Deloro.

This modest wooden building is at present a most interesting scene of activity. Large lots of ore, from one to twenty tons, are there being treated for value and process, and such is the demand for space that the necessity for a larger building is evident.

The chemistry building is also perilously overcrowded. Originally built for 150 students, there must now be provided within its walls class-rooms and laboratory places for 450.

The spirit that pervades this institution is that of intelligent practical service. Its work has in the past been carried on under the disadvantages of inadequate income, and very modest buildings, quite too small in some cases for the needs. To meet the first want the Board of Governors have started a campaign for an endowment of \$200,000. The director of the school, Dr. Goodwin, has been carrying this on for a few months, and we commend it to all our readers who care to invest in a carefully managed institution. It has been said of it in the Ontario Legislature, on the occasion of votes of money for its assistance, that "no institution gives to the province better return for the expenditure of public money." We understand that the School of Mining will appeal to the Ontario Government for the wherewithal to erect the much-needed buildings for mining, metallurgy, and chemistry. Considering the public services rendered by the school, we have no hesitation in sustaining the appeal.

In order to correct a mistake often made in regard to the School of Mining, we note that its charter makes it an independent institution, its corporation consisting of all who subscribe to its funds. The management of the school is completely in the hands of this corporation, which meets annually and elects a Board of Governors.

We append the following tables of attendance taken from the Report of the Dean and Director:—

The statistics for the fifteenth session of the School of Mining make clear that the growth of the school is strong and steady. The numbers are as follows:—



| BY COURSES.                    |       | 1907-7. | 1907-8. |
|--------------------------------|-------|---------|---------|
| Course A (Mining)              | ..... | 96      | 106     |
| " B (Chemistry and Mineralogy) | ..    | 2       | 5       |
| " C (Mineralogy and Geology)   | ..    | 4       | 9       |
| " D (Chemical Engineering)     | ....  | 2       | 7       |
| " E (Civil Engineering)        | ..... | 53      | 64      |
| " F (Mechanical Engineering)   | ..    | 17      | 17      |
| " G (Electrical Engineering)   | ....  | 41      | 59      |
| " H (Sanitary Science)         | ..... | 4       | 5       |
| " J (Power Development)        | ..... | 0       | 2       |
| " Special                      | ..... | 0       | 5       |
|                                |       | 219     | 279     |
| In other courses               | ..... | 203     | 252     |
| Total                          | ..... | 422     | 531     |
| BY YEARS.                      |       | 1906-7. | 1907-8. |
| First Year                     | ..... | 95      | 118     |
| Second Year                    | ..... | 47      | 65      |
| Third Year                     | ..... | 38      | 56      |
| Fourth Year                    | ..... | 39      | 40      |
| Total                          | ..... | 219     | 279     |

| BY PROVINCES.    |       |     |
|------------------|-------|-----|
| Ontario          | ..... | 223 |
| Quebec           | ..... | 10  |
| Manitoba         | ..... | 4   |
| Saskatchewan     | ..... | 1   |
| Alberta          | ..... | 8   |
| British Columbia | ..... | 13  |
| Yukon            | ..... | 1   |
| Nova Scotia      | ..... | 4   |
| New Brunswick    | ..... | 4   |
| England          | ..... | 1   |
| New York         | ..... | 3   |
| Columbia, S.A.   | ..... | 3   |
| Idaho            | ..... | 1   |
| Vermont          | ..... | 1   |
| New Hampshire    | ..... | 1   |
| North Dakota     | ..... | 1   |
| Bermuda          | ..... | 1   |
| Total            | ..... | 279 |

## SPECIAL CORRESPONDENCE

### NOVA SCOTIA.

**Port Hood.**—(Note.—The following is a series of extracts from a letter written for the information of the Canadian Mining Journal.)

#### The Port Hood Richmond Railway Coal Company, Limited.

##### 1908 Review.

In going over the plant in connection with the work done for 1908, it strikes one that a very interesting position of affairs is evident here, and while, of course, we have not reached the output anticipated and hoped for last season, due to many facts which, of course, were unforeseen, such as explosion, labor strike, safety lamp installation, shortage of water, and also our inability to get a sufficient number of men, still the condition of the plant and the work generally for the year taken in comparison with the work accomplished at other collieries must be satisfactory, for example, when we commenced the 1908 operations:—

Mine development was practically worked out, and commencing with the close of navigation, the development of the mine for an output of 800 tons per day was proceeded with, and when navigation opened the mine was developed in such a manner that an output of the above amount could have been maintained, and although the output has not reached to the above amount per day, the development of the mine has been maintained, and at the close of 1908 the mine will be in such a state of development as to maintain the output for practically the season of 1909 with very little additional development.

The slope, for the whole distance of 2,800 feet, has been widened, silled and sleepered, and is now in a most excellent condition.

The bankhead has been strengthened and improved in such a manner as to-day to be in a better condition than at any time since this company took hold of it, and all the machinery has been maintained in as good, if not in a better condition than one year ago. In addition, a new picking belt, to enable us to handle 1,000 tons per day, instead of 400 tons per day, has been installed.

One hundred new pit boxes have been added to the stock, while the old pit boxes have been maintained in a good state of repair.

Twenty-seven new and improved wharf cars have been added, in addition to our stock of 1907.

Two new additional pumps, two additional boilers, together with an additional smoke stack, one new wharf engine, giving us three times the capacity of that which we had in 1907, a new conveyor belt for slack coal, by which means all the coal used in the boilers is conveyed direct from the coal pockets to the boiler-house, thereby doing away with a horse and two men, a new engine for the conveyor plant at the boiler-house, one new engine and a conveyor belt, 36 inches, giving double the capacity of the belt we had in 1907, has been added to the wharf plat, also one large boiler capable of handling all the machinery necessary at the pier has been established. The pier itself has been strengthened and put in a better condition than at any time since it was built, and our storage capacity at the pier increased from 900 to 2,400 tons, enabling us to load and handle steamers from 1,000 to 2,000 tons capacity in from four to seven hours. In addition to the above, there is to-day on the plant ample equipment, so far as we can see, to handle next year's business without any additions whatever of a large or costly nature, and altogether the plant is in a most excellent condition, and fully equipped to handle and develop an output of 1,000 tons per day, and also every bit of the plant from top to bottom has been maintained in a very much improved condition over its previous history, and in addition we have greatly increased the reservoir water supply and laid a pipe line to the pier, a distance of over 3,000 feet, for water supply there.

Monthly costs may now be said to be a fixed maximum basis on the output which we are now receiving, giving us ample scope for reducing, and the reduction of the monthly cost is purely a matter of increased output. Now that the mine is just about entering on the stage of pillar work and having reached a stage where the great trouble and annoyances and increased costs arising from shortages in equipment, lack of facilities, etc., have been overcome, the prospects of 1909 over 1908 in these respects are vastly different and much brighter.

The volume of the output for 1909 is a question of men, not a question of the development of the mine or the facility of handling, and if we secure sufficient men, or if the absence of men we can install mine machines, as discussed with the direct-



ors, the volume of output can be placed at whatever may be desired. In going over the statement, it must be borne in mind that the company have placed all of the improvements outlined above, maintained its property, developed its mine and put it in the state which we are now in, absolutely out of the earnings of the company, and we have not increased the indebtedness one cent for 1908, and practically every item mentioned above is fully paid for; only in the case of the boiler and wharf engine are any installments whatever still due.

During 1908 our market has been practically confined to a few places over Nova Scotia, New Brunswick, Prince Edward Island and Quebec, and to all places shipped we have received, with very few exceptions, a good report of our coal. We have not been able during 1908 to reach some of the markets which we had hoped to reach during the early part of the season, on account of shortage of output, but when the last of December of 1908 arrives, providing weather conditions will permit and navigation remains open, we will not have one pound of coal practically left on the plant. All of our output over and above our own boiler consumption will have been marketed.

Outlook for 1909.—In respect to the raising of the volume, the condition of the property and our ability to handle an increased output is very much brighter than 1908. The question of market, however, gives a more interesting feature than that of 1908 inasmuch as the coal prospects generally are not as bright as last year, and in addition we must anticipate and plan for a considerably increased output.

It may be said, in addition, that the property has been raised from one considered of little or no value to one now looked upon as one of the best coal propositions in Nova Scotia. To-day we find a ready market for all of our coal, whereas in 1907 a market was difficult to obtain, although the demand for coal was very strong, and now, with a weak market generally, we find our coal taking one of the first places on the market for quality, which makes the prospect for 1909 bright indeed in comparison to past years.

**Glance Bay.—Naked Lights vs. Safety Lamps.**—In considering the Port Hood explosion at the beginning of 1908, a Cape Breton jury gave as its verdict an opinion that ten men lost their lives "through the explosion of an explosive mixture." This was not a very illuminating verdict, but the jury had appreciated one thing which it is taking a great many mine explosions to teach us, namely, that if the factors which go to cause an explosion had not been present there would have been no explosion.

What are the factors that lead to mine explosions? There is no mystery about it, as some sapient individuals would have us believe there is. We think in every instance the factors may be resolved into two, and two only—the presence of fire in some form with the simultaneous presence of an inflammable substance, or an explosive mixture, this being generally one or all of three things, viz., marsh gas, coal dust, or some form of blasting powder. Fire is introduced into a mine for two purposes only, first as an illuminant, and secondly as a means to ignite powder. True, electric sparks may arise from electric machinery or transmission underground, but this can be confined to one spot, and with proper fittings it can be practically done away with. The blasting side of the question does not enter into present considerations, except that many persons think that the use of the "squib" in gaseous mines should be discontinued in favor of electric firing.

There are three ways to light a mine, naked lights, safety lamps, and electric light. The latter illuminant can be used in the pit bottom and along the main approaches, but its extension into the working places is a problem as yet not satisfactorily solved. We have left for consideration, therefore, naked lights and safety lamps.

The modern safety lamp gives a good clear light, and the first objection to safety lamps, that they gave a light too dim

to be used satisfactorily, cannot now be advanced. The often-repeated statement that safety lamps increase the danger from falls of roof and side because of the limited range of their illuminating power has never been proved, and never can be. Miners' nystagmus was once laid at the door of safety lamps, but it is now known to result from straining of the elevator muscles of the eye, caused chiefly by handpick underholing in thin seams. The magnetic-lock electrically-ignited type of safety lamp with underground relighters disposes of the objection that men have to lose time when their lamps go out. Such time-worn objections as that safety lamps decrease the miner's earning power have been too frequently exploded to need further demolition. The real sum of all the objections to safety lamps is that they cost money, and that is all there is about it. Those, however, who object on these grounds are as the man who will not insure against fire, who one day rues his omission. In this case, however, not only is money at stake, but human lives.

The foolishness of naked lights in coal mines, to our mind, needs no emphasis. A coal mine is a place where inflammable material is dug out, and the surroundings of the men who work underground are such things as coal, wood, an inflammable dust capable of detonation, explosive gases, brattice cloth, and tub grease. The ordinary citizen would not explore the recesses of his attic with a naked light. He is not so foolish as to put naked flame into contact with inflammable material, which is what is done every time a naked light goes down into a coal mine.

The second volume of the British Royal Commission on Mines states that from 1896 to 1905 there were 183 mine explosions in the United Kingdom, of which 119 were caused by naked lights, 12 by matches, and 17 by open or defective safety lamps; or altogether 148 explosions out of 183 occurred from some form of naked light, being 80 per cent. of all explosions. The explosions that occurred about a year ago in such disquieting numbers, accompanied by such dreadful loss of life, all occurred in open-light mines. The recent disaster at Marianna took place in a developing mine, which was to be a model of every principle of safety, and its officials appear to have been sincerely anxious to design a safe mine. Yet disaster came. The Engineering and Mining Journal says: "The mine was known to be gaseous, and safety lamps were supposed to be employed exclusively in it; but—carelessness again—there were some naked lamps." If anything is worse than naked lights from a point of safety it is perhaps mixed lights. The Port Hood explosion, to which we referred above, although trivial compared with the wholesale destruction caused by the explosions in the United States, is nevertheless a case in point, for it was doubtless caused by the contact of a naked light with marsh gas, probably aggravated by coal dust and loose powder. The Hamstead fire in England was directly caused by the criminally careless use of candles underground.

Naked lights are responsible not only for the majority of mine explosions, but also for most mine fires. Any person who is acquainted with the habits that are associated with the use of naked lights in a coal mine will accept this statement. Where naked lights are used they are generally provided by the miners themselves, and smoking is a usual practice in an open-light mine, with the lax discipline that accompanies the two things. The use of safety lamps is always attended by stricter supervision and more consistent discipline than is to be found in naked light collieries.

For the foregoing reasons, and at the risk of being considered extreme, we take the view that the use of naked lights should be prohibited in all coal mines that employ over thirty men at one time, and they should, of course, be forbidden in even these if any signs of gas are present. The French Government recently prohibited the use of naked light in all and every mine of the French dominions. An extensive development of



coal mining awaits us in Canada, particularly in the prairie country. It is very probable that here the work of mining will be easy and conditions of comparative safety may exist. Under these circumstances the use of naked lights may grow, as they have done in the United States, until we are awakened by something resembling the recent epidemic of disaster there. Nowhere in the world has coal-mining been so easy as in the United States, and miners there have gone along from small things to the present day of huge mines and large outputs, until recent events have awakened the country to a belated consciousness that they are decades behind European practice in everything but the accumulation of dividends. We have no fear that such a state of affairs as exists in American mines will ever become the rule in Canada, but if due regard is had to safety in the day of small things, it will have become a habit in the day of larger things that is coming.

We, therefore, repeat the opinion that naked lights should be forbidden, and that nothing but properly approved and tested types of safety lamps be used in every coal mine in the Dominion, with the possible exception of very small mines employing only a limited number of men.

### ONTARIO.

**Cobalt.**—Regulations in force at Cobalt Lake mine:—

#### Notice.

The quantity of explosives brought into the thawing-house shall not at any time exceed the requirements of the mine for a period of twenty-four hours, except where such requirements would be less than 100 pounds.—Mines Act, Sec. 164, Sub-Sec. 4.

The powder boxes shall be opened not closer than at least 100 feet distant from the thawing-house, and all sawdust carefully removed from the cartridges before they are taken to the thawing-house.—Mines Act, Sec. 64, Sub-Sec. 8.

The powderman shall keep the thawing-house and magazine clean and especially see to it that the floors are free from any sawdust in which the dynamite has been packed.

He shall see that the cans are at all times full of thawed dynamite.

He shall change the water sufficiently frequently for this purpose, using no water warmer than that in which a hand can be immersed without scalding.

He shall at least once a week thoroughly cleanse the cans with warm water and washing soda.

No machine man or other person shall approach or enter the thawing-house with a candle or other naked light, but in all cases is to use a lantern.—Mines Act, Sec. 164, Sub-Sec. 6.

Any machine man taking powder from the cans for firing

shall replace the amount taken with unthawed sticks from the racks so that the cans may at all times be kept full.

In preparing the charge, the fuse must on no account be threaded through the cartridge, but it must on all occasions be inserted in the end, and the wrapper securely tied with twine which is always provided for that purpose.

A charge which has missed fire shall not be withdrawn, but shall be blasted, and in case the missed hole has not been blasted at the end of a shift, that fact shall be reported by the foreman of shift boss to the mine captain or shift boss in charge of the next relay of miners before work is commenced by them.—Mines Act, Sec. 164, Sub-Sec. 10.

In blasting a miss-fire the tamping must not be removed by blowpipe or otherwise closer than six inches of the powder or of the cap which has missed fire.

The machine man shall also notify his partner on opposite shift of any miss-fire before work is resumed.

The employees who have occasion to raise the mine doors shall put up the guardrails or close the gates, as the case may be.—Mines Act, Sec. 164, Sub-Sec. 19.

Workmen may not be lowered or hoisted in shafts, in buckets, skips, or tubs.—Mines Act, Sec. 164, Sub-Sec. 23.

All workmen shall be at the mouth of each shaft at the beginning of every shift promptly as the whistle blows.

At the end of each shift or half-shift five minutes and no more before the whistle blows will be allowed workmen coming from the working face, except on Saturdays, when, except in case of firing, workmen shall remain on duty until relieved by the night shift.

Machine men must in no event use any gelignite that is not thoroughly thawed, and the holes shall be charged and fired as speedily as possible before it has time to freeze.

Any employee who absents himself from work without permission from the office or from the foreman will be discharged.

The machine man shall notify the hoist man at least two hours before he will be ready to fire, and the hoist man shall see that a sufficient quantity of powder is thawed by that time.

Unused sticks of powder or portions of sticks must not be left in the shaft-house or hoist-house, but must be taken back to the thawing-house.

Muckers must look for unused powder in the muck and give same to the foreman or shift boss, who shall put it in a place of safety.

**Ardoch.**—Work has been in active operation since September 14th, under the management of Mr. Geo. R. Rogers. A sample of fifty-five tons of ore has been mined from nine different veins on the property, including the 100-foot level, and run through the company's ten-stamp mill. The values recovered were satisfactory.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Halifax.**—Sensational reports, that lack confirmation, are being circulated concerning the discovery under romantic circumstances of rich silver veins. Credence cannot be given this story until full details have been secured.

Dr. Hugo Von Hagen, who is the originator of two bogus coal companies, one supposed to be operating on a large scale at Maccan, and one in New Brunswick, has chosen a name for the latter company that conflicts with an honest operating company. Von Hagen's Maccan property produces, we are informed, about 20 tons of coal per day. In spite of this his company has been paying dividends since August. He is pure fakir.

The output of the Dominion Coal Company for 1908 exceed 3,519,000 tons. This is an increase over 1907. The other coal mines of Nova Scotia will show good increases.

### ONTARIO.

**Miller Lake.**—Native silver has been found on the White claim of Miller Lake Syndicate.

**Cobalt.**—H. P. Davis has organized a syndicate to work the Flynn property on Cross Lake, upon which native silver has recently been found.

The Cobalt Lake Mining Company has on hand, sacked and ready for shipment, three carloads of cobalt ore, two carloads of niccolite ore, and one carload of fair grade silver ore in the ore-house ready for cobbing.

The frame of the O'Brien concentrator will soon be erected.

The Coniagas mill has 20 stamps dropping.

Returns have been received from the two cars of ore shipped a fortnight ago by the Buffalo Company to the Copper Cliff smelter. One of the cars contained concentrates from the com-



pany's own mills, and ran over a thousand ounces to the ton. The car of ore netted 5,000 ounces to the ton, representing a value of \$70,000. This is one of the most remunerative shipments made out of the camp in some time.

A ton of rich ore is being bagged daily from a six-inch vein of smaltite, niccolite and discrasite on the 75-foot level of No. 3 shaft of the Right of Way mine. Silver leaf in places nearly a quarter of an inch thick is also found in this vein also. Another vein three inches in width has been located on these workings, and also shows high-grade ore. A cross-cut will soon be started north in the direction of the Princess vein, which also heads towards the Right of Way.

Work is being prosecuted at the University mine, and by spring regular shipments will doubtless be resumed. A dozen men are now at work on this property, and the shaft on No. 4 vein is now down about fifty feet. It will be continued to a depth of one hundred or one hundred and fifty feet before drifting will be done. This is a narrow vein, having a surface width of between one and two inches, but the ore shows up all the way down. This vein is so promising that Mr. Watson is having a new ore house erected and a good-sized head frame built. With depth the vein may be expected to widen.

The Crown Reserve has contracted with the Denver Smelter to supply 100 tons of ore a month for January and February. This will yield the company about \$200,000.

## BRITISH COLUMBIA.

**Kaslo.**—After an expenditure of about \$250,000 on the Bluebell property, under the supervision of Mr. S. S. Fowler, is working successfully. The zinc concentrating plant is running. Since July lead concentrates to the amount of 2,000 tons have been shipped to the Trail smelter. Zinc concentrates will now be turned out regularly. French capital is behind the Bluebell.

**Nelson, Dec. 19.**—During the past week the most striking feature in mining circles in south-eastern British Columbia was the semi-official announcement by the Canada Zinc Company, Limited, of the successful operation of their electrical reduction plant at this city, with many interesting details.

The 14th gold brick turned out by the Kootenay Bell mine in the Sheep Creek section since last June, was brought here during the week. The brick weighed 84 ounces and was valued at \$1,500.

A shipment of 313 tons of ore was sent from the Silver King mine at Nelson to the Trail smelter during the week.

The total shipments from the district to date now exceed 1,825,000 tons.

**Phoenix.**—H. Gardner, of London, England, one of the largest shareholders in the Granby Company, was a visitor recently, being shown through the mines by Manager A. B. W. Hodges.

Mr. Gardner is in charge of the London office of the American Metal Company, which handles a large amount of Granby copper, Jacob Langeloth being president of both it and the company.

# MINING NEWS OF THE WORLD.

## FRANCE.

The co-operative colliery, "Mine aux Mineurs," near St. Etienne, which has been worked for some years by the syndicate of miners of the Loire district, has gone into liquidation, no funds being available to meet liabilities or pay current wages.

## RUSSIA.

On January 1st the term for duty-free entry of machinery for the gold mines expired. The mining interests are anxious for a prolongation of the term, but it is considered probable that a duty will be imposed.

A great deal of foreign capital is being invested in mining in Siberia. In the Ushka-Menogov districts English interests representing a capital of £1,000,000 have acquired extensive gold properties, and the English Yenissei Copper Co. is conducting operations on a large scale. The question of the influx of foreign capital into the Urals is exciting considerable discussion in the Russian press.

## GERMANY.

At the general meeting of the Verein für die Bergbauliche Interessen, at Dortmund, it was decided to abandon the projected jubilee festivities owing to the Rodbach colliery disaster, and to devote 100,000 marks to a fund for relieving distress due to mining accidents, and a further sum of 400,000 marks to place on a proper footing the existing fund for granting pensions to technical officials in mines and their widows and orphans.

The Mansfeld Copper Co. will shut down work at the Martin shaft, Kreisfeld, as the rich vein of ore that has been worked for 70 years has become exhausted.

## CHINA.

There is considerable activity in connection with the opening of coal mines in Southern China, especially in the Fa Yuen dis-

trict, not far from Canton. It is believed that there are great mineral resources in Kwang Fung Province, and strong appeals are being made to the authorities for permission to develop them. The Government of Kwangsi has appointed a special commissioner to visit the United States and study American mining methods.

## SOUTH AFRICA.

During the last eighteen months or so the tendency to erect more tube mills and put in heavier stamps at the Rand mines has become more marked. At the beginning of 1908 there were 72 tube mills at work, and the stamp duty was 5.8 tons per day. Over 100 tube mills are now running, and the stamp duty in September was 6.4 tons. Some of the heaviest stamps are: Cinderella Deep, Jupiter, and Knight Central, 1,700 lbs. each; Simmer Deep, 1,670 lbs.; Bantjes Consolidated, Geduld Proprietary, and Vogelstruis Cons. Deep, 1,650 lbs. each. The installation of even heavier stamps is contemplated.

The South African Option Syndicate has located four new diamond areas in the Bembesi district of an aggregate extent of 13 square miles.

## UNITED STATES.

Asbestos has been found on the property of the Union Copper Mining and Development Co., in Northern Wyoming, 28 miles west of Sheridan. It is of a good quality, shading from grey to white, and similar to that found in the copper mines of Nevada and Arizona.

The Secretary of the Interior has withdrawn from entry, selection, and location all public lands in Wyoming, Idaho, and Utah believed to contain phosphate rock, pending action by Congress. The list of lands withdrawn was furnished by the Geological Survey as the result of preliminary examination of the field.



The International Smelting and Refining Co., capitalized at \$50,000,000, has been incorporated in New Jersey by Messrs. Frederic Hoff, Richard C. Hunt, and Nelson W. Runnion, of New York, in opposition to the American Smelting and Refining Co.

The actual manufacture of steel at Gary, Ind., was begun on December 21st, when blast furnace No. 12 was blown in. It is estimated that when the mills are in full operation 25,000 men will be employed.

Prof. Wm. Griffiths, a mining expert, of Scranton, Pa., estimates that at the present rate of consumption the coal supply of the Pennsylvania coal fields will be exhausted in 84 years.

## MEXICO.

The Guanajuata-Jalisco Development Co., organized in New York by Mr. Dwight Furness, with \$4,000,000 capital, has undertaken the development of six groups of mines in Guanajuata and Jalisco covering nearly 1,000 acres. Plants costing \$350,000 have already been installed.

The 300-tons copper-matting plant of the Rio Tinto Company, Chihuahua, has been started, and will handle custom ores of Northern Mexico.

Arrangements have been made for the resumption of work at the iron smelting and machine works, Durango, American capital having been invested.

## COMPANY NOTES.

### GRANBY CONSOLIDATED.

The Granby Consolidated Mining, Smelting and Power Co.'s dividend of \$2 per share, payable Dec. 15, will bring the aggregate dividends to \$3,510,000 since the first return to shareholders was made in December, 1902, two years after the organization of the company.

At a meeting of the bondholders of the Dominion Copper Co., on Nov. 30, the National Trust Co. made a report, in which the assets of the company were enumerated. The receiver's statement of liabilities showed that in addition to the bonded indebtedness of \$800,000 and accrued interest there are outstanding claims against the company amounting to about \$75,000, inclusive of the payrolls for the miners for August and September, which aggregated \$20,000.

Pending the sale, the receiver has been authorized by the

court to borrow \$20,000, for the purpose of defraying the expenses of the receivership. The principal item is the cost of power and labor in keeping the mines pumped out and for watchmen at the smelter and other properties of the company. The receiver estimates that his expenses will aggregate \$4,000 per month.

There will be a meeting of directors of the Dominion Iron and Steel Company in Montreal on December 29.

The Nova Scotia Steel Co. has declared a quarterly dividend of 2 per cent. on the preferred stock, payable January 15.

The statement was made at the special meeting of the Dominion Copper Company that the Granby Consolidated had recently made a bid of \$300,000 for the entire holdings of the corporation of the Dominion Copper Co., including its furnaces and smelting outfit.

## STATISTICS AND RETURNS.

### COBALT ORE SHIPMENTS.

Following are the weekly shipments from Cobalt camp, and those from Jan. 1 to date:—

|                           | Week end.   |               |
|---------------------------|-------------|---------------|
|                           | Dec. 12.    | Since Jan. 1. |
|                           | Ore in lbs. | Ore in lbs.   |
| Crown Reserve .....       | 57,000      | 1,123,688     |
| Chambers-Ferland. . . . . | 60,000      | 503,890       |
| Drummond. . . . .         | 40,000      | 1,331,520     |
| La Rose .....             | 151,100     | 8,793,470     |
| McKinley-Darragh. . . . . | 41,340      | 3,322,810     |
| Nipissing. . . . .        | 202,562     | 8,790,502     |
| O'Brien. . . . .          | 127,837     | 6,782,718     |
| Right of Way .....        | 185,480     | 1,486,250     |
| Silver Queen .....        | 127,000     | 1,826,390     |
| Silver Cliff .....        | 120,000     | 318,100       |
| Temiskaming. . . . .      | 60,000      | 1,234,980     |
| Trethewey. . . . .        | 65,000      | 400,670       |
| T. & H. B. . . . .        | 120,000     | 2,433,660     |

The total shipments for the week were 1,357,319 pounds, or 378 tons.

### COBALT ORE SHIPMENTS.

Following are the weekly shipments from Cobalt camp, and those from Jan. 1 to date:—

|                   | Week end.   |               |
|-------------------|-------------|---------------|
|                   | Dec. 12.    | Since Jan. 1. |
|                   | Ore in lbs. | Ore in lbs.   |
| Buffalo. . . . .  | 54,980      | 1,071,930     |
| Coniagas. . . . . | .....       | 2,320,288     |

|                           |         |           |
|---------------------------|---------|-----------|
| Cobalt Lake .....         | .....   | 404,623   |
| Crown Reserve .....       | 120,000 | 1,243,688 |
| Cobalt Central .....      | .....   | 527,935   |
| Chambers-Ferland. . . . . | .....   | 503,890   |
| City of Cobalt .....      | 60,000  | 1,513,140 |
| Drummond. . . . .         | .....   | 1,331,520 |
| Foster. . . . .           | .....   | 437,300   |
| Kerr Lake .....           | .....   | 1,152,794 |
| King Edward. . . . .      | .....   | 127,240   |
| La Rose .....             | 195,000 | 8,988,470 |
| McKinley-Darragh. . . . . | 115,800 | 3,438,610 |
| Nipissing. . . . .        | 130,760 | 3,921,262 |
| Nova Scotia .....         | .....   | 487,675   |
| Little Nipissing .....    | .....   | 40,110    |
| Naney Helen .....         | .....   | 408,977   |
| Peterson Lake .....       | .....   | 41,237    |
| O'Brien. . . . .          | .....   | 6,782,718 |
| Right of Way .....        | 62,100  | 1,548,350 |
| Provincial. . . . .       | .....   | 143,210   |
| Silver Leaf .....         | .....   | 372,900   |
| Silver Queen .....        | 67,000  | 1,903,390 |
| Silver Cliff .....        | 44,000  | 362,100   |
| Temiskaming. . . . .      | 60,000  | 1,294,980 |
| Trethewey. . . . .        | 131,000 | 531,670   |
| T. & H. B. . . . .        | .....   | 2,433,660 |
| Watts. . . . .            | .....   | 561,680   |

The total shipments for the week were 1,040,640 pounds, or 520 pounds. Total shipments from Jan. 1 to date are 45,585,030 pounds, or 22,792 tons. The total shipments for the year 1907 were 28,081,010 pounds, or 14,040 tons.

**B. C. ORE SHIPMENTS.**

The following are the ore shipments for the week ending Dec. 19 and year to date in tons:—

**Boundary Shipments.**

Total. . . . . 34,758 1,406,199

**Rosland Shipments.**

Total. . . . . 5,440 287,489

**Slocan-Kootenay Shipments.**

Total. . . . . 3,561 131,895

The total shipments for the past week, 43,759 tons, and for the year to date, 1,825,673 tons.

**Granby Smelter Receipts.****Grand Forks, B.C.**

Granby. . . . . 20,536 1,006,659

**B. C. Copper Co.'s Receipts.****Greenwood, B.C.**

Total. . . . . 11,805 343,372

**Consolidated Co.'s Receipts.****Trail, B.C.**

Total. . . . . 7,366 319,942

**Le Roi Smelter Receipts. . . . .****Northport, Wash.**

Total. . . . . 1,273 83,710

The total receipts at the various smelters for the past week were 40,980 tons and for the year to date 1,781,285 tons.

The output of the Crow's Nest Pass collieries for the week ending on December 11th was 18,214 tons, a daily average of 3,035 tons; week ending December 13, 1907, 24,536 tons, a daily average of 4,089 tons.

**B. C. COPPER COMPANY.**

The following sets forth the output, costs and net earnings of the B. C. Copper Company for the six months ending November 30th, 1908:—

| 1908.               | Lbs. Fine Copper<br>produced from B.C. Ores. | Net Profits.* |
|---------------------|----------------------------------------------|---------------|
| June . . . . .      | 891,032 .097c                                | \$25,850      |
| July . . . . .      | 1,038,944 .0812                              | 49,934        |
| August . . . . .    | 1,069,367 .0815                              | 59,634        |
| September . . . . . | 829,282 .1057                                | 23,933        |
| October . . . . .   | 760,811 .1074                                | 20,349        |
| November . . . . .  | 958,438                                      | 47,000        |

5,547,874 lbs.

Profits from other sources . . . . . 5,900

\$232,609

\*Cost production per lb. laid down in New York—Average cost per lb. for 5 months .0932c. This average cost per lb. will be somewhat reduced by lower cost in November details not having been received.

As the billing prices of copper were below the prices at which settlements will be made, the net profits for the six months will be somewhat greater than here shown:—

**Value at Time of Shipment.**

| Shipped.            | Percentage of |         |          |           |               |
|---------------------|---------------|---------|----------|-----------|---------------|
|                     | Copper        | Silver  | Gold     | Total     | Gold and      |
|                     | Value.        | Value.  | Value.   | Value.    | Silver Value. |
| June . . . . .      | \$88,339      | \$3,813 | \$27,986 | \$120,156 | 26 per cent.  |
| July . . . . .      | 135,899       | 5,592   | 46,398   | 187,859   | 28 per cent.  |
| August . . . . .    | 173,153       | 6,878   | 62,237   | 242,278   | 29 per cent.  |
| September . . . . . | 115,609       | 4,274   | 39,823   | 159,706   | 28 per cent.  |
| October . . . . .   | 98,328        | 3,745   | 37,635   | 139,718   | 30 per cent.  |
| November . . . . .  | 134,535       | 4,871   | 48,972   | 188,378   | 29 per cent.  |

The company ceased operations at its mines and smelting plant November 26th, 1907, and resumed on June 1st, 1908.

The following are the figures of German consumption of foreign copper for the months of January and October, 1908:—

Imports of copper . . . . . 135,347 tons.  
Exports of copper . . . . . 7,342 tons.

Consumption of copper . . . . . 128,005 tons.

as compared with consumption during the same period in 1907 of 96,395 tons. Of this quantity 124,408 tons were imported from the United States.—Reported by L. Vogelstein & Co., New York.

**DECREASED PRODUCTION IN 1907.**

The total production of gold and silver in the United States in 1907, according to figures published by the United States Geological Survey as the result of conference and adjustment between that bureau and the Bureau of the Mint, was valued at \$127,735,400.

The total production of gold for the year was 4,374,827 fine ounces, valued at \$90,435,700—a decrease, when compared with the production in 1906, of 190,506 fine ounces, worth \$3,939,100.

The production of silver in 1907 amounted to 56,514,700 fine ounces, with a commercial value of \$37,299,700. As compared with the production of 1906 this is a decrease in quantity of 3,200 fine ounces and in value of \$956,700.

**SILVER PRICES.**

|                       | New York.<br>cents. | London.<br>pence. |
|-----------------------|---------------------|-------------------|
| December 9 . . . . .  | 49                  | 22 5-8            |
| December 10 . . . . . | 49 1-4              | 22 3-4            |
| December 11 . . . . . | 48 5-8              | 22 7-16           |
| December 12 . . . . . | 48 3-4              | 22 1-2            |
| December 14 . . . . . | 48 3-4              | 22 1-2            |
| December 15 . . . . . | 48 3-4              | 22 1-2            |
| December 16 . . . . . | 48 3-4              | 22 5-16           |
| December 17 . . . . . | 48 3-8              | 22 5-16           |
| December 18 . . . . . | 48 1-4              | 22 1-4            |
| December 19 . . . . . | 48 1-2              | 22 3-8            |
| December 21 . . . . . | 48 5-8              | 22 7-16           |
| December 22 . . . . . | 48 1-2              | 22 3-8            |
| December 23 . . . . . | 48 3-8              | 22 1-2            |
| December 24 . . . . . | 49 3-8              | 22 3-4            |

**MARKET REPORTS.**

December 23:

Connellsville coke, f.o.b., ovens:—  
Furnace coke, prompt, \$1.80 to \$1.90.  
Foundry coke, prompt, \$2.15.

**Metals.**

December 23:

Tin, Straits, 29.25 cents.  
Copper, prime Lake, 14.37½ cents to 14.50.  
Lake arsenical brands, 14.37½ cents to 14.50.  
Electrolytic copper, 14.12½ cents.  
Copper wire, 15.75 cents.  
Lead, 4.20 cents.  
Spelter, 5.12½ cents.  
Sheet zinc, 7.50 cents.  
Antimony, Cookson's, 8.12½ cents.  
Aluminium, 24 cents.  
Nickel, 40 to 47 cents.  
Platinum, \$22.50 to \$23.50 per ounce.  
Bismuth, \$1.75 per pound.  
Quicksilver, \$45.00 per 75 lb. flask.



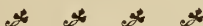
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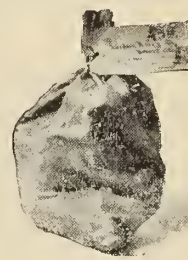
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## The Mineral Province of Canada

has produced to the end of 1906, \$68,721,103 of Placer Gold; \$41,015,697 of Lode Gold, \$25,586,008 of Silver; \$17,625,739 of Lead; \$35,546,578 of Copper; \$79,334,798 of Coal and Coke; and \$5,813,799 of Other Minerals; or a total of **\$273,643,722**. The Mineral Production of the Province for 1906 was

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We are shipping domestic coal to points in Manitoba, Alberta, Saskatchewan, British Columbia, Montana, Washington and Idaho, a territory of over 400,000 square miles, and WE ARE GIVING SATISFACTION.

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W. W. CORY, Deputy of the Minister of the Interior

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# The Canadian Miner's Buying Directory.

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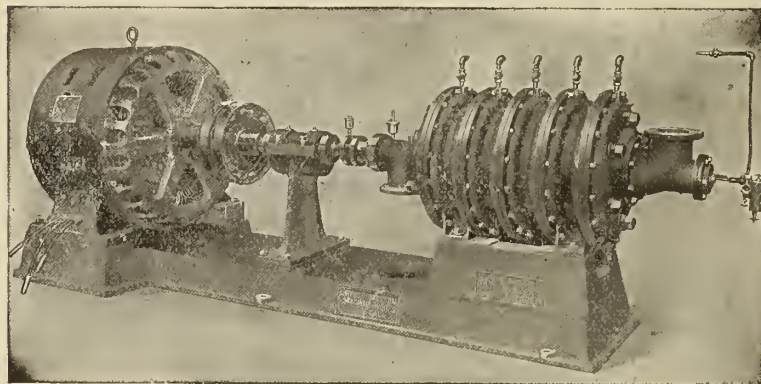
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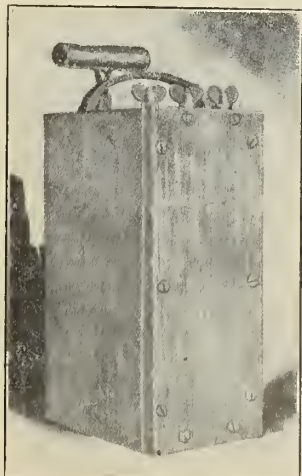
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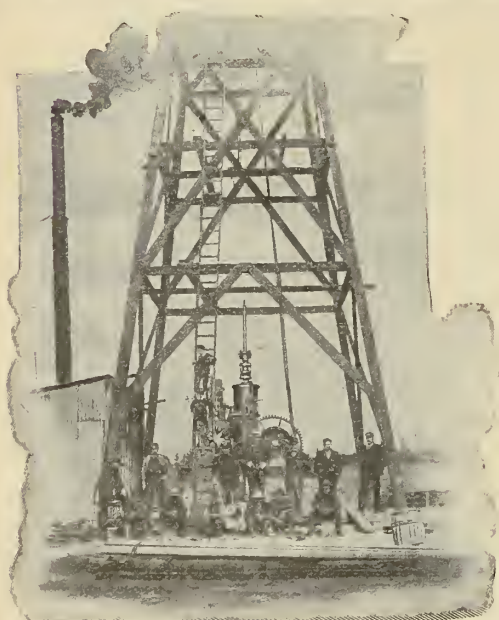
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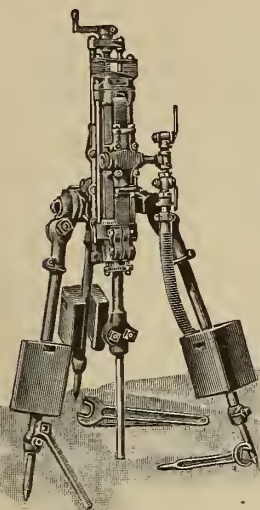
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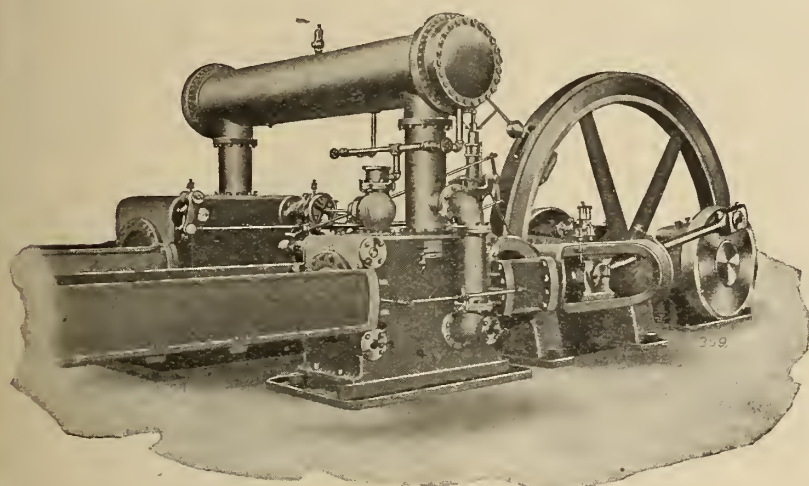
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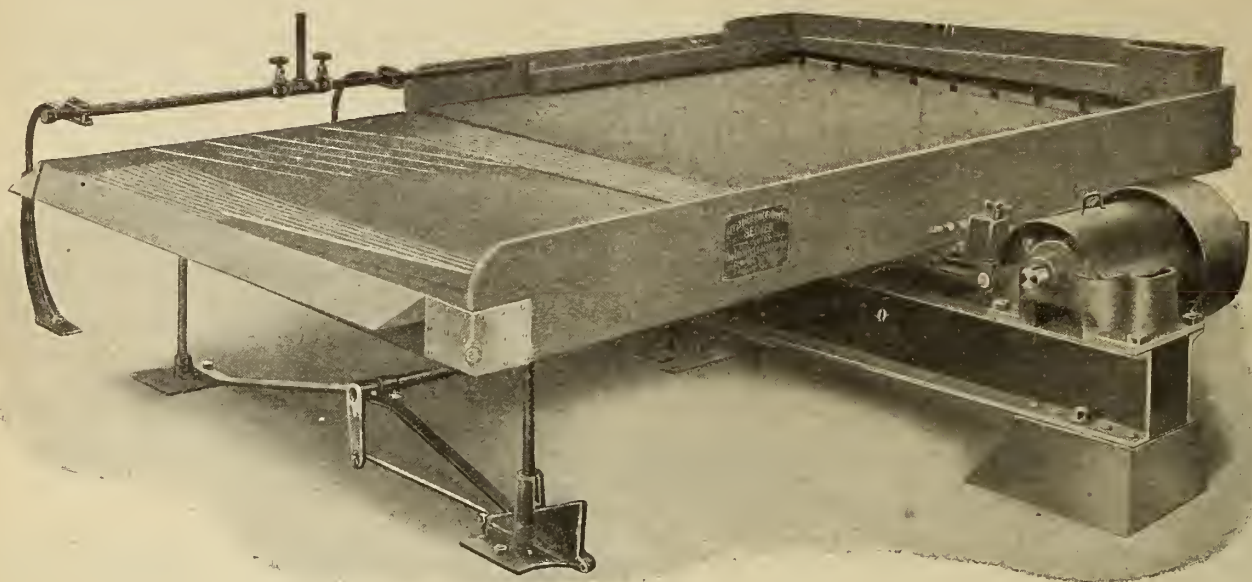
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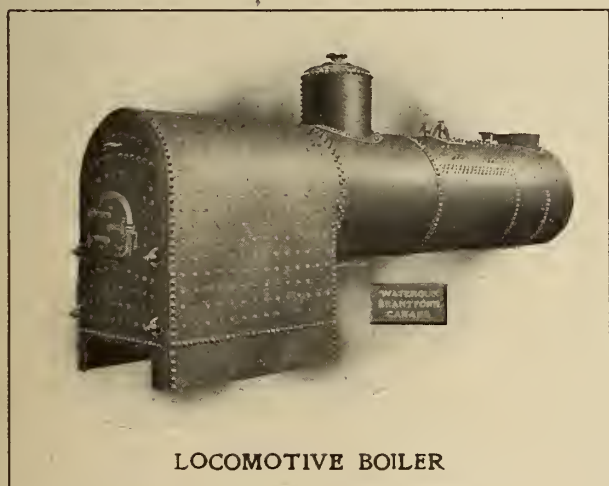
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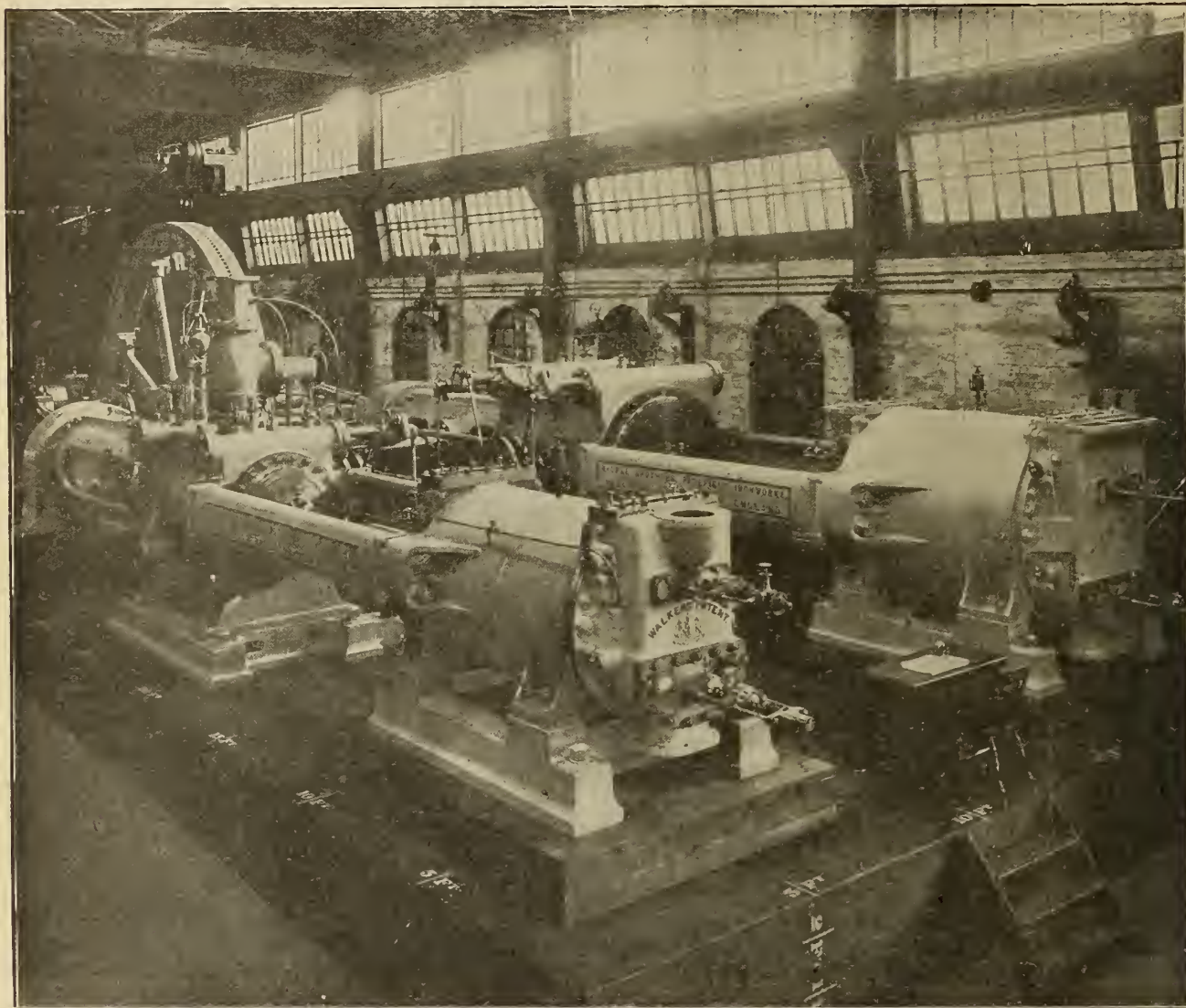
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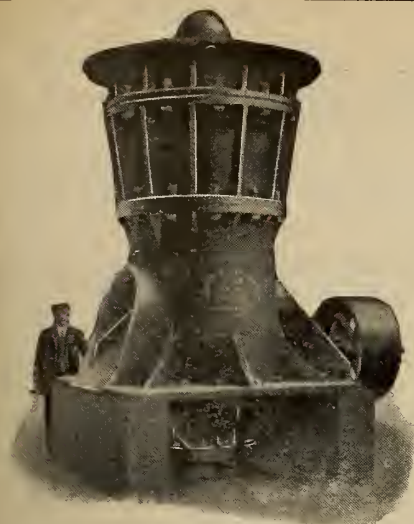
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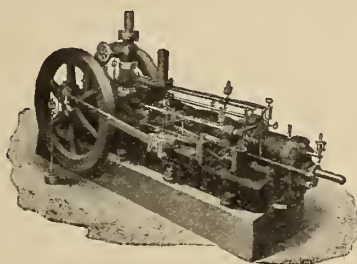
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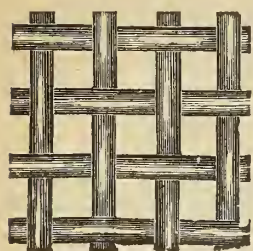
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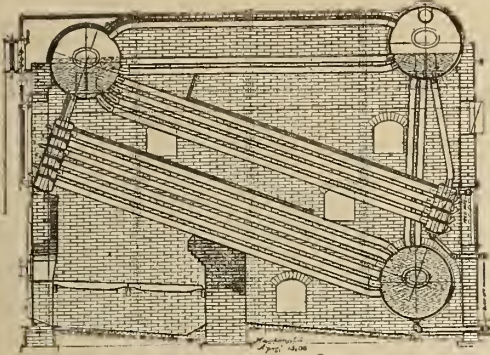
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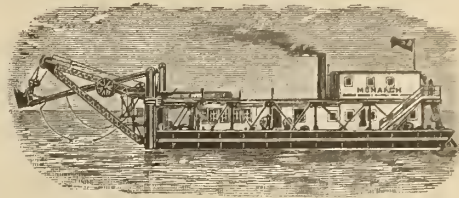
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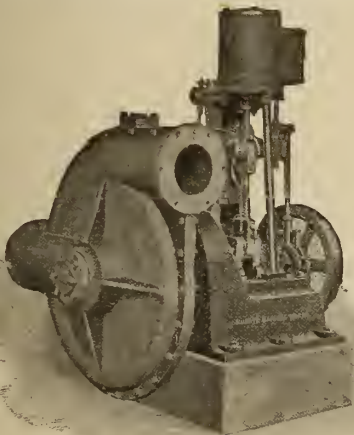
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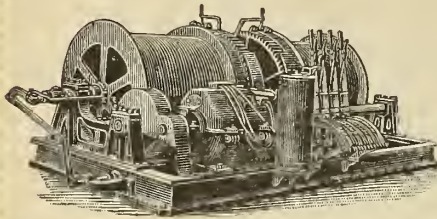
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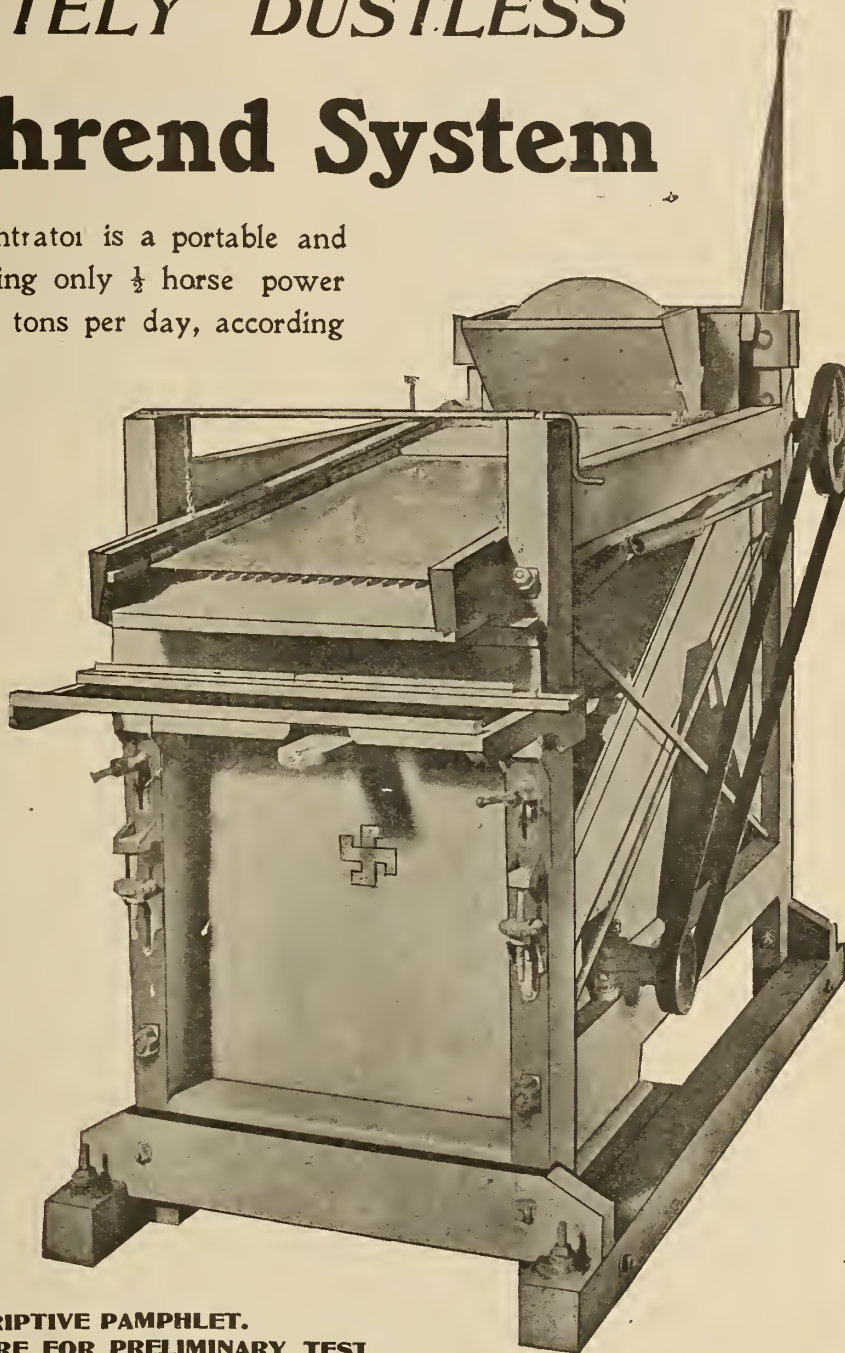
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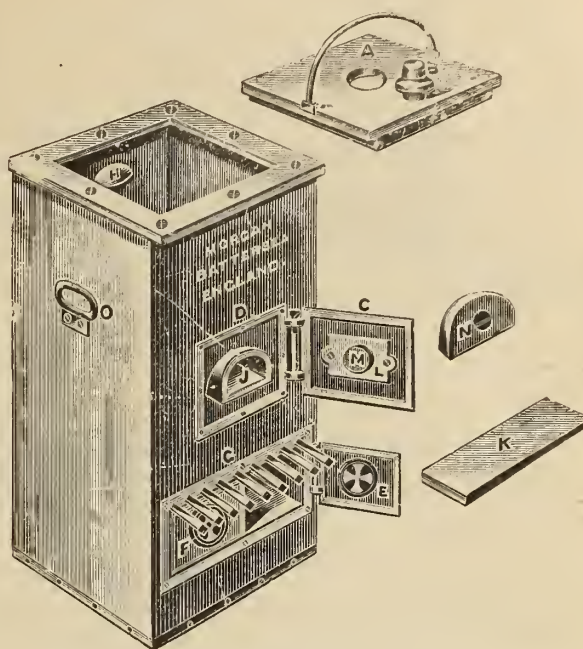
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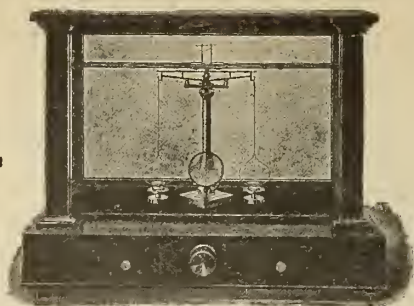
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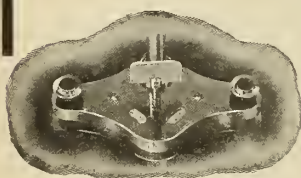
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### THE UNIT BASE

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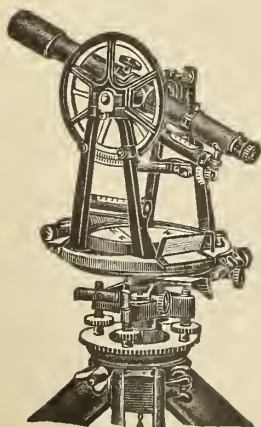
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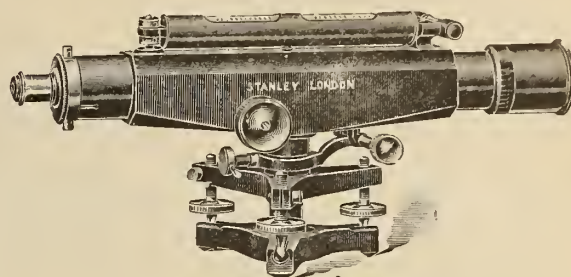
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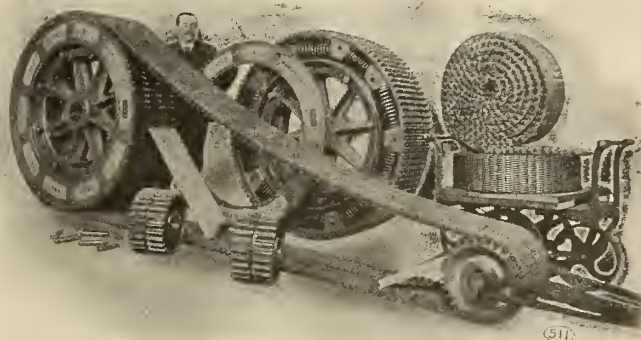
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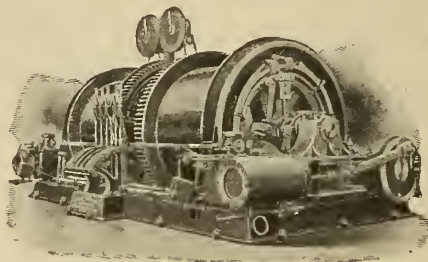
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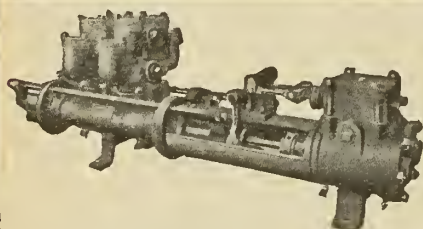
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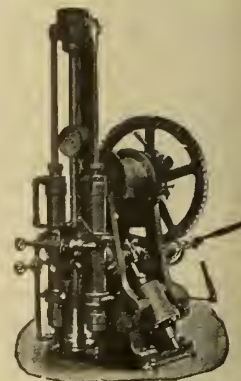
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# THE CANADIAN MINING JOURNAL

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No. 2

## The Canadian Mining Journal

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### CIRCULATION.

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### SALARIES AND THE SURVEY.

Within the memory of the present generation there has been no substantial increase in the salaries of the officers of the Geological Survey of Canada. Meanwhile, no one will dispute the statement that the cost of living is easily 30 per cent greater than it was ten years ago. House rents have crept up amazingly. Provisions bring prices sometimes 100 per cent. higher than those obtaining in the early nineties. And so on through the whole gamut. We could dwell with deep conviction upon the iniquitous tailor, the destructive milliner, the reprehensible plumber, the callous coal man, and the aestival ice man.

These things being so, it is not to be denied that the salaries of yesterday are altogether out of keeping with the conditions of to-day. To expect a competent geologist to exist contentedly upon the pittance offered him by the Government is out of all reason. There may be some degree of justice (we grant it merely for argument's sake) in keeping the salaries of office men and clerks down to the minimum. But between these and the officials of the Survey there is nothing in common. The geologist is a specialist of the highest class. He is a pioneer, an explorer, a scientist, an author and a producer. There is nothing more remote from economy than attempting to retain his services for pay that will not permit of his living in comfort. Already our own survey has lost some of its best and brightest members. In every recent case those who have resigned their billets at Ottawa have been engaged by private corporations and are receiving salaries from three to five times larger than those offered by the Government. Whilst we are still able to point with pride to the men who constitute the staff of the survey, there is no lack of evidence that the growing demand for field geologists will, sooner or later, rob that staff of its best and brainiest.

The geologist is no money-grabber. Possibly his commercial sense is under-developed. But he has an inalienable right to secure as good a living as he can. His efforts are constantly revealing new sources of wealth to the public—wealth in which, if he be an official in Government employ, he cannot participate. If, after some years of miserably underpaid work on our Survey, he accepts a flattering offer from persons who know his value, who can blame him! Yet we are confident that, since for many good reasons there is a certain professional glamour pertaining to the work of Survey officials, but very few members of the staff would hesitate to remain in the employ of the Government for salaries much smaller than they can easily obtain outside. But these salaries must be considerably larger than the meagre allowances of to-day which are

consonant neither with the dignity of the Canadian Government nor with the requirements of modern life.

### THE GRANBY CONSOLIDATED.

Through the courtesy of Manager A. B. W. Hodges of the Granby Consolidated Mining, Smelting & Power Company, Limited, Grand Forks, B.C., we are able to present on another page of this issue a summary of the progress made by his company during the past year.

We wish to note a few salient facts that are presented in Mr. Hodges' communication.

The Granby smelter treated more than one million tons of low-grade copper ore, producing therefrom 23,535,009 pounds of copper. There was no serious interruption throughout the year. Not only were the records of former years excelled, but large additions were made to the smelting plant. At the mines the necessary development work and diamond drilling were not neglected.

The capacity of the smelter is now about 3,000 tons of ore per day. During this year, when the company's plans for enlargement shall have been completed, the plant will have an ore capacity of 4,000 tons per day.

The vigorous and sanely constructive policy pursued by Manager Hodges is an object lesson to Canadian mine managers. Those who are familiar with conditions in southeastern British Columbia will appreciate the vigilance and strength with which the affairs of the Granby Consolidated are administered.

### PARLIAMENTARY REPRESENTATION.

The desirability of parliamentary representation for the larger Canadian universities has been discussed editorially by the daily press. For the present it is probable that no definite action will result from this discussion. No agitation is perceptible. Apparently the country is hardly prepared to act upon a suggestion that, though good in itself, requires a deal of digestion. And, no doubt, our universities are content to wait the fullness of time.

Meanwhile the mining industry suffers from an actual absence of representation in our legislatures. At Ottawa we need, and must have, not one but several members of parliament and senate, appointed primarily to guard mining interests. An industry whose annual output is valued at one hundred million dollars can claim a right to a considerable voice in the administration of national affairs.

Possibly a good beginning would be the selection of a suitably qualified mining man to fill one of the vacancies in the senate.

### MINE ACCIDENTS.

The distressing frequency with which accidents are occurring in the mines of the Cobalt regions calls for strong comment. In the Seventeenth Annual Report

of the Bureau of Mines of Ontario, Mr. E. T. Corkill, Provincial Inspector of Mines, sounds a note of warning. After analysis of the tale of accidents for 1907, Mr. Corkill concludes that due care on the part of superintendents and workmen would prevent many of these fatalities. This is true also of practically all the recent mine casualties.

The employment of incompetent workmen in any positions where their ignorance or unfitness may endanger the lives of their fellow-laborers is unjustifiable. The careless superintendent or foreman begets carelessness in his men. The vigilantly watchful superintendent inspires those under him with a sense of their individual responsibility.

When then it can be stated that a large percentage of the accidents occurring in the mines of the Cobalt district are traceable to neglect on the part of superintendents or workmen, or both, it is high time that some examples were made. The man, whether he be boss or mucker, who through disregard of all reasonable precautions imperils the lives of his fellows, is essentially a criminal, and should be treated as such. Undoubtedly, offenders of this class deserve the most rigorous punishment.

### DIKES AND VEINS.

To those who wish to acquire an accurate conception of the geology of the Montreal River district we recommend the excerpts from Dr. Barlow's report that appear on another page of this issue. On another page, also, Dr. Barlow replies to Mr. Tyrrell's criticisms. We shall not touch upon the controversial points, for when doctors disagree the role of spectator is most profitable.

We desire, however, to draw attention to a recommendation made by Dr. Barlow. "The use of the terms 'dike' and 'vein' as separate names in regard to pegmatite is misleading. The strict limitation of their meaning has led to certain misconceptions as to its manner of formation. I would prefer," says Dr. Barlow, "to make the two terms synonymous, or, better still, to use 'vein' in both senses, for, accurately speaking, every 'mineral vein' is intrusive into the surrounding country." This sounds suspiciously like common sense. Let us, by all means, simplify our heterogeneous technical terminology. If "dike" offends us let us cut it out.

### RESCUE APPARATUS.

It is to be hoped that the subject of life-saving in coal mines will be one of the topics chosen for discussion at the March meeting of the Canadian Mining Institute. There is, certainly, no subject that more needs publicity. Apart from the collieries of the Dominion Coal Company at Glace Bay and those of the Nova Scotia Steel and Coal Company at Sydney Mines,



there is not a colliery in Canada equipped with rescue apparatus.

Considering the rapid extension of the coalfields of Alberta, Saskatchewan, and British Columbia, it is pre-eminently desirable that fully equipped stations be established at suitably central points where groups of mines could be served. Such a station is proposed for Pictou County, Nova Scotia, where the collieries of the Acadia Coal Company and of the Intercolonial Coal Company are situated. Perhaps the best demonstration of the practical utility of rescue apparatus was given last year, when a party of fire-fighters was sent by the Dominion Coal Company to fight a conflagration in the workings of one of the Nova Scotia Steel and Coal Company's mines. Since then the latter company has ordered equipment for its own collieries.

From both the humanitarian and the business points of view rescue apparatus, providing means of respiration in irrespirable atmosphere, is a modern necessity. The Canadian Mining Institute will do well to encourage, by every means possible, the general introduction of any approved type of apparatus in Canadian coal mining centres.

#### FROM REAL LIFE.

A mining engineer, manager of a well-known Ontario mine, has sent us a naive document. From a town in one of the middle states a searcher after truth addressed a letter to our correspondent, who, in turn, has forwarded it to us.

The letter consists of a series of leading questions concerning certain Cobalt mines. Not only does the enquirer demand specific information about these enterprises, but he requests that the opinions of the engineer's friends be obtained. "I would like very much," declares this ingenuous citizen of the great republic, "for you to answer by return mail and state what you and others, who should know, think."

As if to bind the engineer irrevocably, a dime (ten cent piece) was cunningly affixed to the back of the letter by means of mucilage. Under it is a legend that should be preserved: "Please buy Canadian stamp for my return directed envelope and please keep balance for trouble in replying." That he might be sure of receiving full measure for this staggering fee, the writer takes advantage of a blank space remaining to subjoin one last query.

Fantastic as is this letter, it is not altogether out of keeping with the attitude of the public towards mining engineers. We know of many instances that illustrate this point. Often the mining engineer is offered a fee at which a bricklayer would scoff.

#### A CONTRADICTION.

Positive assertions have been made in late newspapers to the effect that the O'Brien Mine, Cobalt, has

been sold. There is no foundation for either assertions or rumors on this point. We are authorized to state that no such transaction has taken place.

#### A CORRECTION.

In the statements of ore shipments from Cobalt the O'Brien Mine has been done an injustice through the omission of the figure indicating millions of pounds. It will be noticed that the O'Brien, in point of view of tonnage, is third in the list of shippers.

#### CANADIAN MINING INSTITUTE.

The following is a list of gentlemen elected to membership at council meeting held on December 5th, 1908: Wm. J. Elmendorf, M.E., Box 1039, Spokane, Wash., U.S.A.; W. A. Fairchild, M.E., Nipissing Mines, Cobalt, Ont.; H. E. Lawson, M.E., 38 Elgin Ave., Toronto, Ont.; Joseph T. Mandy, M.E., Box 585, Cobalt, Ont.; Morgan C. Milne, Elk Lake, Ont.; John T. Shadforth, Victoria, B.C.; Henry Strangways, Crean Hill Mines, Victoria Mines, Ont. Associate Members—A. E. Bowers, Northport, Wash., U.S.A.

Mr. Henry Strangways was formerly a student member.

The following drafts have been returned (wrong address): Frank M. Perry, 27 Walmer Road, Toronto, Ont.; Chas. H. Hayes, 114 Bay St., Toronto, Ont.; B. B. Harlan, 9 King St. West, Toronto, Ont.; W. K. McNeill, Toronto, Ont. (address insufficient); R. J. Gaskin, Kingston (left there, said to be in Toronto). The Secretary of the Canadian Mining Institute will deem it a favor if the above named members will forward their present addresses to him. His address is Room 3, Windsor Hotel, Montreal.

To show how great may be the generation of static electricity in German factories, Prof. M. M. Richter has drawn sparks an inch to an inch and a half long from a 5-inch belt on a wheel making 10,000 revolutions a minute. The risk of explosion in dust or gases seems to have been overlooked. Coating with bronze or aluminum powder prevented static charges, while a weekly application of acid-free glycerine was a remedy and added durability to the leather.

When such substances as glass or porcelain cannot be used for acid-proof apparatus, platinum has been the one material available, but for many purposes this is too costly. As a substitute, M. Jouve, a French engineer, has announced a series of alloys which he calls, "metillures." These are silicides of iron and manganese, with a large percentage of silicon, and they are so resistant to strong acids, hot or cold, that they have been employed in distilling nitric acid and in concentrating sulphuric acid.



# A RESUME OF THE NOVA SCOTIAN COAL MINING INDUSTRY FOR 1908.

By F. W. Gray.

In the 1907 resume we forecasted for 1908 a steady increase in coal production, and on the whole the forecast has been maintained. The progress made is, however, more real than apparent, because 1908 has been a year of financial depression, and the market has not admitted of the increased outputs that Nova Scotian coal mines are prepared to produce when the demand arises. An approximate estimate of 1908 shipments compared with the figures for 1907 as follows:—

|                                | 1907.     | 1908.     |
|--------------------------------|-----------|-----------|
| Dominion Coal Company.....     | 3,156,000 | 3,200,000 |
| Nova Scotia Steel & Coal Co... | 630,000   | 640,000   |
| Acadia Coal Company.....       | 322,000   | 320,000   |
| Cumberland Ry. & Coal Co....   | 276,000   | 350,000   |
| Intercolonial Coal Co.....     | 274,000   | 240,000   |
| Inverness Ry. & Coal Co.....   | 243,000   | 260,000   |
| Port Hood .....                | 64,000    | 100,000   |
| Other companies .....          | 150,000   | 150,000   |
|                                | 5,115,000 | 5,260,000 |

In common with the remainder of the Dominion, the province had an early and open spring, and a summer of exceptionally fine and dry weather. Coal shipments to Montreal commenced about six weeks earlier than in the previous year, and the lead gained was well maintained until the month of September. Towards the end of this month the navigation of the St. Lawrence was greatly hindered by the smoke from forest fires, which for weeks together obscured the river from Gaspe to Montreal. The weather was serene and sunny, and at times the blue haze of the smoke reached as far as the Cape Breton coast. Notwithstanding, however, the serious delays from this cause, the tonnage of coal shipped from Nova Scotia to St. Lawrence ports during the season of 1908 was the largest in the history of the trade. The Dominion Coal Company's shipments for the season totalled 1,346,000 tons. Their St. Lawrence shipments during 1907 were 1,146,000 tons, a record figure at that date.

As previously intimated, the season's shipments would have been very much larger had it not been for the marked depression in the demand which characterized the late summer. Nova Scotia did not feel the full reflex of the financial panic of the previous October until the autumn. The mining centres, indeed, were not affected until the cessation of shipments to the St. Lawrence.

One other feature of the season just past, which at the present time is exercising an adverse influence on the coal mines of Nova Scotia, is the persistent and strenuous attempt which is being made to introduce United States coal into Quebec and Ontario. The United States operators are evidently making a determined effort to capture the Canadian market, and the recent proposals of the Pittsburgh coal operators asking for free customs entry of United States coal into the Dominion, are not without their significance to the Nova Scotia mining industry.

For many reasons United States coal can be put on the Montreal market in better physical condition than coal from Nova Scotia. The very excellence of the Cape Breton coals, for example, militates against their

appearance when they arrive in Montreal. These coals are pure and fragile in their structure. They quickly disintegrate, but the process does not adversely affect their heating or commercial value to the consumer. In many respects Cape Breton coal resembles Pocahontas coal. Did our Nova Scotian coals always sell on their B.T.U.'s, they would very easily challenge competition with any United States fuel that retails in Montreal. Purchasers of coal are very human, however, and they often prefer looks to quality. One large company in Cape Breton intend to hold their trade in Upper Canada against all comers, and they are facing this problem at the present time with a view to so improving their coal handling appliances that their product will be placed on the market in the best possible physical condition.

Realizing, no doubt, that the coal industry is the most important one in the province, the General Assembly of the Legislature devoted a large proportion of the session to the consideration of matters connected with the mining law. A much-needed measure was "An Act to Consolidate the Coal Mine Regulation Act," which passed the Houses on the 16th of April. The old Coal Mines Regulation Act had been so often amended that the amendments exceeded in bulk the original enactment, and the consolidated measure renders it much easier to understand the statute. Power is given to the Commissioner of Mines to appoint a commission to enquire into the method of illumination in coal mines, and if the commission report that safety lamps are required, the Commissioner has power to order that they shall be adopted in any coal mine. The submarine mining law provides that "the Commissioner may vary or modify provisions where from the report of the Inspector it appears to his satisfaction that valuable coal areas cannot be otherwise wrought or mined." Some day Nova Scotia is going to have submarine coal mines of greater magnitude than anything that has yet been projected, and without doubt the provisions of the mining law as they relate to submarine workings will keep pace with the progress made and the experience gained. During the summer the Government employed Mr. T. E. Forster, of Newcastle-on-Tyne, to report on the submarine areas of the province. Mr. Forster is a gentleman who has had a unique experience in undersea working of coal seams and no doubt any modifications that may be made in the regulations will be based on his expert advice.

The report of the commission appointed by a previous session to enquire into the status of the colliery relief societies and the possibilities of an old age pension scheme was presented to the House. Acting upon the recommendations of this commission, an Act was passed entitled "An Act to incorporate the Nova Scotia Colliery Workers' Provident Society, and to create an Old Age Pension Board." The Act provides for the formation of a board, composed of the Commissioner of Mines and Works, who is chairman; the Provincial Treasurer, as treasurer; the Deputy Commissioner, who is secretary, and three other members, one of which number is the appointee of the coal owners, the other two being nominated by the members of the relief societies. This board takes custody of all society



branch funds in excess of \$1,000. Towards the ordinary work of relief the Government contributes a sum not to exceed 12½ cents per month per member, nor an aggregate of \$18,000 yearly. The coal owners contribute 6½ cents per month per member, and the members continue their present subscriptions. An emergency fund is to be created for the purpose of special aid in case of serious disaster, to be accumulated in the manner following.

Ten per cent. of all surplus funds is to be reserved, and a contribution of 30 cents per head per year will be made by each member, in addition to which the Government may contribute a sum of not more than \$2,000 per year. When the fund by process of yearly accretion has grown to \$50,000 it is to be available for the support of widows of deceased members. When it has grown to \$100,000 the children of deceased members are also to participate. The pension and total disability fund is to be raised by a contribution from the Government equal to that made to the ordinary relief branch, and a levy of 75 cents per annum per member on the operators. All relief afforded through the operation of the Act is exempt from lien or attachment for debt of any kind.

The Act comes into effect by proclamation of the Governor in Council, until which time the present relief societies continue as they are.

The proposals of the Government, if carried to their logical conclusion, contain the embryo of some of the sanest and therefore ultimately the most beneficial legislation that has come to our notice. The burden of providing relief and of caring for the victims and the worn-out in the industrial battle is equitably apportioned between the operators, the workmen, and the owners of the royalty—in this case the Government itself. This division avoids on the one hand the Scylla of the British Workmen's Compensation Act and its attendant millstone of old age pensions, and on the other hand it steers clear of the Charybdis of the German system of state-controlled compulsory insurance.

Unfortunately, the provisions of the Act are still in abeyance, owing, we understand, to objections urged by the miners in Cape Breton County.

At the request of the members for Cape Breton, the Government appointed a commission to enquire into the probable effect and the feasibility of an eight-hour day in Nova Scotian industries. The commission is composed of three members. Professor Magill, now of Dalhousie University, is the chairman, the two other members being Mr. Robb, of the Robb Engineering Company, Amherst, and Mr. Henry Macdonald, of Glace Bay. Following the lead of the English Commission, these gentlemen have issued preliminary questions to employers of labor, and expect to begin their sittings of enquiry early in 1909. Any proposal of an eight-hour day for coal workers will meet with the most determined and strenuous opposition from all colliery owners and operators and from large coal consumers. It is well within the mark to say that a statutory limit of eight hours to the working day in coal mines will throw the coal trade entirely into the hands of the large companies, who alone could survive the alteration in conditions. It would extinguish all the smaller companies, raise the price of coal to the consumer by 50 per cent., and would give over the St. Lawrence market to the American operators. In addition to this the large companies would be compelled to force a reduction in wages equal at least to the decrease in the working day, and serious industrial troubles would in all probability ensue.

Another matter with which the Government dealt was that of technical education, and their proposals in this connection cannot but meet with the cordial approval and support of the mining population. Provision has been made for the gradual establishment of technical schools in the large industrial centres. A Technical College is under construction at the present time in Halifax, which will eventually form the headquarters of technical education in Nova Scotia. The coal mining districts have been divided into five, in each of which an instructor is appointed, who devotes his whole time to the teaching of mining subjects, and, where necessary, local assistants are appointed to aid the instructor. Where circumstances justify the expenditure engineers' certificates required by the provincial law. At both the mining and engineering classes a certain knowledge of arithmetic and English is required. Preparatory classes are provided for those who do not possess these qualifications, and there is, therefore, no obstacle whatever in the way of the man who wishes to advance himself in the technical knowledge of his trade. The general supervision of the technical education work is given to a Director of Technical Education, an office ably filled by Prof. F. H. Sexton. An amendment to the statutes passed at the last session provides that the Council of any municipality may grant an amount for the support of a technical school, and may include this amount in their annual estimates, the money being collectable through the municipal rates in the same manner as other rates and taxes. The tuition given by the Government's classes is quite free of charge to those who comply with the rules as to attendance.

The proposals of the Government appear to have been well thought out, and so far the attendance at the classes has been as large as was anticipated for the first year. There are few places in the Dominion where technical education is more needed than in Nova Scotia, and once the young miner and steelworker realizes the value of the opportunities offered to him it is certain the work will advance rapidly. That the action of the Government was timely and necessary is evidenced by the great number of students of American correspondence schools that are to be found in Nova Scotia. The education obtained by personal tuition, aided by the actual handlink of the mechanism and objects used in everyday work, is much more valuable and lasting than that obtained through correspondence classes, and incidentally it will keep a lot of money in the province that formerly went to the United States. In making these remarks we do not wish to disparage correspondence classes. They have done invaluable pioneer work, and many men to-day owe their positions to conscientious study of correspondence lessons in their homes. It is just this class of men who will welcome and use the facilities now offered by the Government.

Of considerable interest to the coal companies who have a large export trade is an enactment of the Federal Government, which becomes effective on the 1st of January, 1909, excluding from Canadian coastal waters all vessels of foreign register under 1,500 tons gross tonnage. This law provides further for the entire exclusion of foreign ships after the expiration of a period of three years from 1st January, 1909. The order is aimed entirely at Norwegian shipping in the coastal and lake trades, and is a modification of an Order-in-Council which prohibited any foreign vessel from plying between Canadian ports after 1st January, 1909.



The proposals of the Federal Government necessarily imply a heavily subsidized shipbuilding industry for the future, as it is entirely out of the question that Nova Scotian coal companies can afford to become large owners of ships, for which during six months of each year at least they would have no employment. Mining is a sufficiently risky business without the added uncertainties of the business of the shipowner. Whether, in face of the enormous tonnage of unemployed freighters that are now lying at anchor in ports all the world over, it will pay to build special colliers in Canada within the next three years, is open to question.

The early part of the year saw a great many Boards of Conciliation appointed under the provisions of the Lemieux Act, so-called. The Provincial Workmen's Association made a general demand upon the operators for an increase in the wages of the laboring class at the mines to date from the 1st of May. The three years' agreement between the Dominion Coal Company and its workmen expired with the year 1907, and as detailed in our previous resume, the company opened up negotiations for the renewal of the old arrangement. This was refused by the men, whereupon the Coal Company issued a new schedule of wages, the principal features of which were an increase to the unskilled laboring class and to the unskilled contract coal-loaders in the mine; a decreased rate for pillar drawing, and an increase in the price of house coal to workmen. The men applied for the appointment of a Board of Conciliation, which was granted, and a satisfactory settlement was arrived at in March, which is to hold good until the 31st of December, 1909. The chairman of the Board of Conciliation was Professor Adam Shortt, a gentleman whose conspicuous abilities in the gentle art of conciliation are unfortunately no longer available. The basis of the adjustment arrived at was an increase to the ill-paid men and a decrease in the wages of the higher-paid classes. The policy which guided the Glace Bay Board seems to have been followed by all the others of later date. At Sydney Mines, Port Hood and Springhill a similarly satisfactory settlement of wages disputes was made.

Following possibly the lead of the United States operators an attempt has been made by the United Mine Workers of America to capture the organization and the funds of the Provincial Workmen's Association of Nova Scotia. The methods of the latter union, as interpreted by the Grand Officers, do not appear to have been sufficiently aggressive for some of the more fervent spirits, and attacks were made particularly on the Grand Secretary and the Grand Master, who asked to be allowed to resign. The Grand Council in session refused to allow them to do so. The question of amalgamation with the U. M. W. A. was referred to a vote of the members of the P. W. A., who were, however, so indifferent that not half of the membership visited the polls. The result of the referendum was a majority of about 500 in favor of amalgamation with the American body, but it was recognized that so indecisive a vote did not justify any change. Since that date the sympathizers of the U. M. W. A. amalgamation have entered action against the P. W. A. for a share of the Defence Fund. They also succeeded in getting an injunction forbidding the Grand Council to act in an official capacity until the action had been adjudicated upon. The injunction was later dissolved, no grounds being found for its continuance. This was followed by an action for perjury against the Grand Secretary, of the P. W. A., brought upon pretexts so flimsy that the defendant's counsel relied upon the evidence of

the prosecution to acquit his client, and did not call any witnesses for the defence. The judge dismissed the action, and expressed a strong opinion that the time of the court had been wasted. The suit of the U. M. W. A. against the Grand Council will be heard in January.

The labor supply during the season was more plentiful than for many years previous, in consequence of the industrial slackness. The loss of output due to absenteeism was not so marked as in years when the supply of labor was scanty. The increase in wages, which was given to the unskilled laborers, proved of benefit in retaining the services of these men. The cost of living, especially in the Cape Breton mining districts, remains inexcusably and oppressively high. The price of groceries is not excessive, but dairy produce, clothing and boots are sold at prices which severely tax the pockets of the miners.

It is once more a matter for congratulation that no great disaster has marked the year in our coal mines, more especially when we read of recurring mining catastrophes in other parts of the world. The accident involving the greatest loss of life occurred at Port Hood Colliery on the 7th of February, on which occasion ten men lost their lives through the contact of a naked light with an explosive mixture. The Government appointed a Commission to enquire into the accident, and as a result of the Commission's report the Government compelled the company to provide safety lamps. We hope before long to see safety lamps become compulsory in all Nova Scotian mines whether they are reputed "gassy" or non-gaseous mines.

The Rescue Station of the Dominion Coal Company was completed in the latter part of 1907 and went into full operation early in 1908. The training of rescuers has been carried on continuously throughout the year, and considerable additions were made to the equipment. The first call on the services of the station was made in September, when 22 of the Dominion Coal Company's men went to Sydney Mines and rendered valuable assistance in coping with an underground fire in the No. 1 mine of the Nova Scotia Steel and Coal Co. This company have just recently purchased twelve sets of Draeger apparatus, the same type that is used at Glace Bay, with the needful accessories, and are about to erect their own station. A project was mooted some time ago for the erection at the joint expense of the mainland collieries and the Provincial Government of a rescue station in Pictou County, but so far as we can learn, nothing further has been done. It is to be hoped that this project will not be allowed to drop.

An interesting feature of the year was the flying visit, one might almost say, meteoric visit, of the representatives of the English Institution of Mining Engineers and the Iron and Steel Institute to Nova Scotia in August. These gentlemen were the guests of the Mining Society of Nova Scotia, and, under their guidance, visited the mines of the Nova Scotia Steel Co. at Sydney Mines and those of the Dominion Coal Company at Glace Bay. They visited also the works of the Dominion Iron and Steel Co. in Sydney. A banquet was given in Sydney in honor of the visitors, which was attended by the Lieutenant-Governor and the Premier of the Province.

The most important new development of the year is the opening of new collieries by the Dominion Coal Company on their Lingan-Victoria areas. Three new collieries are projected, to be known as Nos. 12, 14, and 15 Mines. Nos. 12 and 14 are slope mines on the Victoria Seam, and are already under way. No. 15 is yet to be opened on the Lingan Seam, but the site is not as



yet definitely decided upon. The face of the deeps of No. 12 is down a distance of 1,500 feet from the entrance of the slopes, and by the summer of 1909 the mine will be sufficiently developed to produce an output of over 500 tons daily if required to do so. The bankhead is partly erected and most of the permanent colliery erections are completed. At No. 14 the face of the deeps is 500 feet down, and a temporary bankhead and boilers are erected. No permanent structures have as yet been built.

A branch railway has been constructed connecting Nos. 12 and 14 with the main line of the Sydney and Louisburg Railway. A number of the miners' houses have been built, and the sites of the towns have been graded. This new development marks a distinct stage in the coal industry of Cape Breton. Within the next five years these new mines will add possibly an additional million tons per year to the coal production of the Province.

The Hub Mine, of the Dominion Coal Company, resumed hoisting in the spring, and the improvements effected since the fire will bring the output to over 1,000 tons daily next summer.

Rumors of new mining enterprises have been more than usually rife, but nothing of any importance has taken place in this connection during the year. Messrs. Harmsworth, of "Daily Mail" fame, have bought the New Campbellton mine and areas at the entrance to the Great Bras d'Or, and are credited with the intention of mining coal for their pulp mills in Newfoundland. These areas are small and it is not likely that their operation will be a serious factor in the market.

Nothing further has been done with the abandoned property of the Broughton Company near Sydney, although the promoters have visited the property during the year.

The North Atlantic Company operating the old Gowrie property are producing about 500 tons per day, and have important developments in prospect.

The C. P. R. are credited with the intention of bonding several detached areas in the Sydney coal field, ly-

ing outside the areas of the Dominion Coal Company, and covering some of the lower and little known seams. It is extremely unlikely, however, that these areas will be touched until the exhaustion of the more profitable and easily worked seams makes it possible to work the thinner seams at a profit, and this is a day yet far distant. The present prices of coal will not permit of the profitable operation of thin or inferior seams by themselves, although they can be worked in conjunction with more valuable seams.

It is also reported that a Toronto syndicate have in contemplation the formation of a merger company to absorb the Inverness County coal trade, and take over the Inverness, Port Hood and Mabou Mines. The Inverness County outputs, with the possible exception of Mabou Mines, show a general increase.

The Maritime Coal and Railway Company, which is now operating the Chignecto Mines and has acquired the mine and railway of the Old Joggins Mine, has shown considerable enterprise during the year, and is reported to have made winnings on the Joggins Main Seam, which greatly add to the value of its areas. It would appear from the recent researches of the Geological Survey in this neighborhood that systematic search may reveal more valuable coal deposits than have hitherto been suspected between Apple River and the mines now working at Chignecto and Springhill.

At the present time the coal trade is very quiet indeed, and present indications are that the coming year will not be one that will break any records in the way of coal production. The whole world is suffering from a period of depression, and although signs are not wanting that this is moving away, it is probable that Nova Scotia will be slow to feel the improvement as she was slow to feel the depression, owing to our position on the fringe of things. In any case there is no justification for any glowing forecasts of the progress of the coal industry in 1909. Whenever the spurt is required Nova Scotia will be found more than ready, but at present it looks as if the capacity for coal production will be ample for the needs of next year.

## MAGDALEN ISLANDS AND THEIR RESOURCES.

The Magdalen Islands are situated about the middle of the Gulf of St. Lawrence, and are within the parallels of forty-seven degrees and thirty minutes and forty-seven degrees and five minutes north latitude, and between sixty-one degrees and eight minutes and sixty-two degrees and twelve minutes west longitude, and at a distance of about one hundred and fifty miles from the coast of Gaspe, sixty miles from Meat Cove, Cape Breton (the landing point of the cable, connecting the islands with the mainland), and one hundred and twenty miles from Pictou, Nova Scotia.

There are ten distinct islands in the group, now designated on all charts and in public documents under the names of Entry Island, Amherst, Dead Man's, Grindstone, Allright, Wolfe, Grosse Isle, Coffin and Bryon, and the grant also includes the Bird Islands. Four of these, namely, Entry, Dead Man's, Bryon and the Bird Islands are isolated, having no connection with each other or with the principal group. The other six islands, namely, Grosse Isle, Coffin, Allright, Wolfe, Grindstone and Amherst comprised in the Letters Patent, under the collective name of "Magdalen

Islands" are, in a way, united to each other by sand dunes. In some places lagoons of considerable extent are formed by these dunes.

The principal harbors (at which the steamer from Pictou, N.S., calls twice a week landing mails and passengers) are Amherst, House Harbor and Grand Entry.

The steamer also calls at the breawkaters at Amherst and Grindstone, and the landing places at Allright Island, Coffin Island and Etang du Nord.

Some idea may be formed of the great extent of the islands when it is considered that there is a distance of seventy miles from Amherst Harbour, the south-east extremity of these islands to East Point, the extreme north-east limit of the principal group, and that the extent of coast line is about one hundred and forty miles. Including the beaches, sand dunes and low lying tracts of land, the estimated total area is 77,980 acres.

All the islands have good roads well maintained. They offer special advantages and inducements to the farmer. The soil requires little or no manure, although no part, perhaps, of the continent of America has with-



in itself so much material suitable for fertilizing purposes.

Here the farmer can settle down on lands that for attractiveness are not easily excelled. Good crops can be grown year after year in general abundance, and the location is such that the principal markets of the Maritime Provinces are within easy access, as well as the large cities on the St. Lawrence River.

The population of the islands is about 5,000, principally of French descent. The exceptions are Entry Island, which is Scotch, and Coffin Island, which is English. The people are of good moral character, cheerful and industrious.

Joseph Bouchette, in his report to the Crown Lands Department of the Province of Quebec, has this to say respecting the history of the Magdalen Islands.

"Contemporaneous with the earliest discoveries of the River and Gulf of St. Lawrence, and of the territories adjacent thereto, may be dated the discovery of Jacques Cartier, in 1534 and 1535, and by other French navigators in the early part of the sixteenth century of that remarkable group of islands in the Gulf of St. Lawrence, collectively known as the Magdalen Islands.

"These islands, with the countries bordering on the Gulf of St. Lawrence, were subsequently involved in the various conflicts between England and France, and were the subject at different periods of treaties and conventions, transferring them from one of these sovereignties to the other, until finally by the Treaty of Peace, they were, together with all the countries known as La Nouvelle France, or Canada, Nova Scotia or Acadie, the Island of St. John (now Prince Edward Island), ceded by France to England, and in virtue of the Royal Proclamation of 7th October, 1763, annexed to the Government of Newfoundland, to which they remained attached until the Imperial Act 14, Geo. III., Chap. 33, commonly called the 'Quebec Act,' they were detached from that Province and annexed to the Province of Quebec, thereby created.

"By the Imperial Act 31, Geo. III., Chap. 33, repealing certain parts of 14th, of the same reign, and which divided the Province of Quebec into the Provinces of Lower and Upper Canada, the Magdalen Islands were attached to the County of Gaspé, agreeably to the proclamation of Sir Elured Clarke, dated 17th November, 1791, and on the division of the said County of Gaspé into the counties of Gaspé and Bonaventure, in virtue of the Provincial Act 9, Geo. III., Chap. 73, the said islands were declared to form part of the first-named county, to which they have remained attached under the Union Act already cited.

"Shortly after the cession of Canada to Great Britain, under the treaty of 1763, the Honorable the late Major Samuel Holland, being appointed (1764) by His Majesty George III., Surveyor-General of the Northern District of the British North American Provinces, received orders from the Lord Commissioner of Plantations to execute a survey of the Magdalen Islands and the adjacent islands situate in the Gulf of St. Lawrence.

"This service was assigned to Lieutenant Frederick Haldimand, by whom it was performed with great care and considerable talent.

"Agreeably to this survey of the Magdalen Islands Major Holland returned a description on the 2nd April, 1793, called for in Mr. Secretary Ryland's letter, dated 13th December, 1797, in compliance with the directions received by the Governor of this Province, from His Majesty's Ministers, to make a grant to Captain

Isaac Coffin of the Magdalen Islands as a reward for his naval services, the grant to contain, however, the usual reservation for the maintenance of the Protestant Clergy in Lower Canada required under the Imperial Statute, 31 Geo. III., Cap. 31."

In pursuance of the directions referred to the Magdalen Islands were granted by Letters Patent of the 24th of April, 1793, to Isaac Coffin, of London, then Captain of the Royal Navy, afterwards Sir Isaac Coffin, Baronet, His Majesty's Admiral of the Red.

**Topography.**—The low lands which border the sea coast present a uniform appearance, generally undulating or level. The centre of the islands are made up of numerous conical-shaped hills, some as high as 580 feet above sea level.

No rocks are observed protruding through the wall, which extends from the highest to the lowest point and every foot of land is available for cultivation.

A more agreeable seaside resort than the Magdalen Islands could not easily be found on any part of our coasts. The great extent of clean, sandy beach, backed by a deep green sward, resembling a well-kept lawn and the comparatively shallow water, considerably warmer than it generally is on the St. Lawrence, afford unrivalled bathing facilities.

These islands are not the barren, isolated spots, conceived by some, but, on the contrary, the best authorities assert that the soil of the Magdalen Islands is much richer than that of Prince Edward Island, which is considered the "Garden of the Gulf."

**Geology.**—The geological formations of these islands present great uniformity, and what may be said of one can apply with equal accuracy to the others.

In appearance they show the numerous conically-shaped hills to be made up of eruptive rocks, principally diabase and dolerite. These rocks exposed by eruptions to the atmospheric elements have disintegrated and decomposed, forming a heavy overburden of clay and loam.

This series is overlain by the Silurian Division, in which we find the Niagara and Clifton groups. This again is overlain by the Lower Carboniferous series, giving us the cherts of marine limestone and gypsum. Following upward we find the triassic formation, similar to that of Prince Edward Island, and forming almost the entire sea board of the islands.

There is very little, if any, evidence of glacial erosion, but the erosion due to local forces has been very great. But few outcrops of the limestone are found, and none of the cherts in the solid. Evidently the latter have been made up of thin layers, and are now only represented by scattered fragments.

The eruption of the basic rocks, accompanied by chemical actions, in which the metallic sulphides have been oxydized, has converted much of the carbonate of lime into sulphate of lime, which exists in large quantities on all of the islands. It is also possible that the manganese occurring here originally existed in the carbonate state, and was subsequently transformed into an oxide.

**Economical Minerals.**—The following minerals of economic value are known to exist on the islands: Manganese in the forms pyrolusite, psilomelane, manganite, and wad or bog ore. Limonite, carrying a high percentage of manganese. Gypsum in large quantities, limestone and dolomite. Clays of various colors. Ochres, red and brown. Silica sands, some showing 95 per cent. pure silica.

**Manganese.**—From the above, manganese seems to demand special attention. Here it is found in the



residual clay derived from the decay of the limestone. This clay covers a large area, and the manganese occurs in lenticular masses as oxides of various forms, but principally, as above mentioned, as pyrolusite and psilomelane, the hydrous and anhydrous peroxides. Nevertheless, there seems to be all gradations in degree of admixture, and it is often difficult to draw the line of demarcation.

Some attempt has been made to prospect this area, and numerous pits and trenches have been put in, but in no place has this work determined the extent of any body of ore. It is true that from one pit on the Quinn farm about ten tons of ore was produced, from another about three tons, and in almost all the pits ore in more or less quantities was found, yet the work was stopped and no attempt has been made to develop the area.

An analysis made by Messrs. Torrey and Eaton, New York, 1901, from ore taken from the Quinn pit gave the following results:

|                                |              |           |
|--------------------------------|--------------|-----------|
| Metallic Manganese .....       | 64.62        | per cent. |
| Oxides of Iron and Aluminum .. | 1.55         | per cent. |
| Silica. ....                   | 1.40         | per cent. |
| Moisture. ....                 | .80          | per cent. |
| Sulphur. ....                  | nil          |           |
| Phosphorus .....               | nil          |           |
| Oxygen by difference .....     | 31.63        | per cent. |
|                                | <hr/> 100.00 | per cent. |

Gypsum.—The mineral which shows the next in importance on the islands is gypsum. This is found in great variety and in large quantities, but no attempt has been made to exploit it.

## SUGGESTIONS AS TO THE USE OF CONTOURED MAPS.

By D. B. Dowling, B.Sc.

Mapmakers are always striving to give as much information on their productions as possible. With the advance of surveys the maps become more accurate, but difficulties arise when it is proposed to show the surface slopes and elevations. Hill shading is the most graphic and easiest understood, but it is apt to obscure portions where other details are to be shown. The method of showing contours is the best from an engineer's standpoint. We occasionally find, however, that even with men who are familiar with the contour map, many have great difficulty in making the mental picture of the relief implied.

For these let me suggest a simple expedient, which need not necessarily be carried past stage 2, as shown in the appended illustrations.

Mount a number of copies of the map, if printed copies are obtainable, on cardboard sheets, or trace each contour line separately on a sheet. It is not a difficult matter then to cut along one contour line on each sheet, beginning with the lowest and discarding the part that represents lower portions.

With the printed map on each piece of cardboard it is easy to fit the pieces in proper order, and you then have the map as at first, but with a rough step-like relief. When the contours have to be traced on the cardboard it is better to trace not only the line to be cut, but some of the other details above it to the next contour line.

If the cardboard can be selected from a large stock, the vertical scale can be made very nearly correct.

To illustrate, I have taken the map of the Crow's Nest coal fields reduced in Fig. 1, and mounted copies on sheets of cardboard. These when cut out along the contour lines were built up, with the result as shown in Fig. 2. The question naturally is asked, How should they be fastened in place? A wooden base should be provided and the layers of cardboard built up on it.

FIG. 1.

The best medium is carpenters' glue and a hot flatiron to press the sheets flat and remelt the glue. The centre portions of the sheet need not be glued; small-headed tacks are used, care being taken that they are to be covered by the next, succeeding sheet of cardboard.

The rough model thus obtained, as in Fig. 2, goes a long way toward showing the relief of the country, but many would prefer smoothing off these slopes. This can be done either by carving or filling the steps

with putty, clay or wax. The filling is possibly the easier, but the surface is not very permanent. I have favored carving the cardboard by using curved knives instead of carving tools. The surface thus obtained is

plane than the rest of the map. This plan is optional, but it serves as a protection. In Fig. 4 details, such as coloring and conventional signs for railways, streams, boundaries, etc., are added. The coloring representing



FIG. 2.

smooth, and will take paint or other coloring. In Fig. 2 a start has been made toward carving, but Fig. 3 is a representation of the finished surface. It will be noticed that the blank spaces on the side of the map, including the space for title, are built up to a higher

the coal measures has photographed very dark, and occupies the central part of the trough.

One advantage of a model is the ease with which sections may be shown. Cuts may be made across the model and the section painted on the edge of the cut.

## CANADIAN COPPER COMPANY.

By D. F. BROWNE.

During the last four years the converting department of the Canadian Copper Company has been in temporary quarters in one end of the furnace building. This building was designed to cover five furnaces, each 50x204 inches. Three of these furnaces were erected in 1904 and 1905, and the space designed for the other two was appropriated for four converter stands. The crane span, being but 31 feet wide, while ample for the needs of the furnaces alone, was ill adapted to the needs of the converters, and as the space occupied by

these stands was required for the erection of the two remaining furnaces, the removal of the converting department to permanent quarters was necessary. In the fall of 1907 the new converter building was started. As this building presents many features of structural and economic interest, the following description is given.

The converter building lies 80 feet to the east of and parallel with the furnace building. It is 522 feet long and 130 feet wide at its widest point. It covers





CONTOURED MAPS.—FIG. 3.



CONTOURED MAPS.—FIG. 4.

four departments, first, the quartz crushing and clay drying room, 70 feet by 60; second, the storage bins for quartz, clay and old linings, with the pugmills for crushing and mixing the lining material, which requires a space of 60 feet by 60 feet; third, the relining platform and drying stands, 112 feet long and 130 feet wide, and fourth, the converter room, with space for 10 converter stands and the necessary sculling tracks and the matte moulds, which require a stretch of 280 by 95 feet.

The building is of steel, with a uniform height of 47 feet to the roof trusses. The roof is of Bonanza tile, made of concrete and expanded metal. The sides of the converter and re-lining room are covered with corrugated iron, while the quartz crushing and pugmill department, where greater protection from the winter's cold is required, is sided with ferro inclave and cement plaster.

The plan of the building shows two matte tracks No. 17 whereon the furnace matte is transferred in 7-ton steel ladles on a transfer truck by an electric motor and cable from the furnace to the converter building. A system of signals is installed, whereby the foreman of the converter building can see at a glance just how much matte is in the settlers in the furnace

building, and can call for any desired amount of matte for the converters.

The converter room is 60 feet wide and 280 feet long, with a shed 35 feet wide on the east side. The stands are arranged along the west side at a distance of 16 feet from the wall. The converters are 23 feet 6 inches from centre to centre, except at the north end of the building, where a space of 30 feet 6 inches is left for crane repairs between the north end wall and the first stand, and also between No. 5 and No. 6 stands, where a space of 33 feet 6 inches is left for the matte transfer track and the converter flue stack.

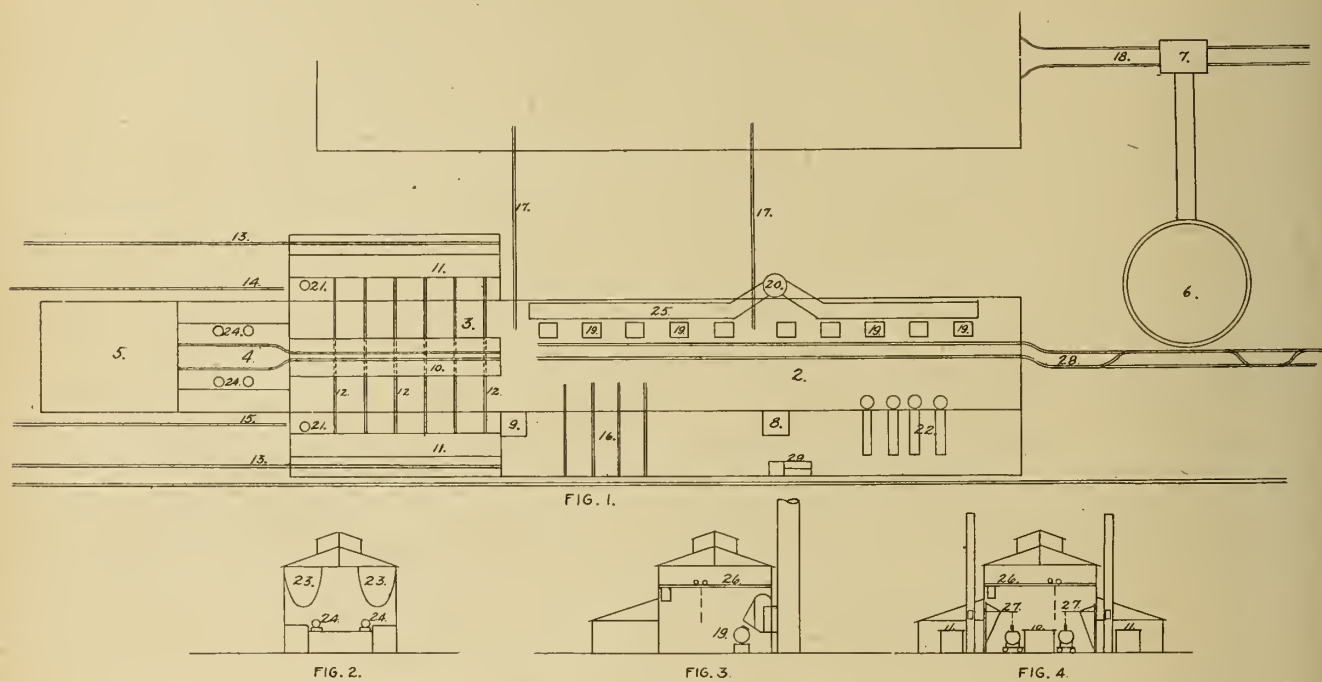
These ten converter stands are electrically operated from two pulpits, each taking care of five stands. These pulpits are opposite the converters on the east side, one opposite the space between No. 5 and No. 6 stands, the other opposite the lower matte track at No. 10 stand. The centre line of the converters—that is, the centre of revolution—is 10 feet from the floor line. This allows the use of large ladles for matte and slag, and does away with the floor pits, which were a source of annoyance in the old building.

The converter gases are carried away by a sheet iron flue 4 feet wide and 13 feet high, which is carried on brackets behind the converters at a height of 11 feet



from the floor. This leads from both ends to a steel stack outside the building 125 feet high, 12 feet in diameter at the bottom, and 9 feet at the top. Above each converter a breeching 5 feet wide projects 5 feet from this flue. In this breeching the hood proper swings out from the top over the converter, as shown in the section. As the lines of this hood lie parallel with the edge of the converter flame, and as the gases have a clear rise of 20 feet before striking the top of the flue, all ejected sparks of matte and slag are so cooled that they do not stick to the iron work, and the former accumulations of fused masses in the hood are entirely avoided. The lower portion of the breeching is on an angle of 45 degrees, and a door here dropping on hinges allows the loose accumulation of flue dust to fall on the floor behind the converters. Doors are also provided along the bottom of the flue and in the base of the stack for the removal of this dust.

gooseneck swivel union, from which a 10 inch wrought iron pipe rises opposite the centre of rotation of the converter. This pipe rises to a height of 4½ feet above the centre of the shell is brought back by a cast iron return bend to this centre. Here it ends in a cast iron adjusting sleeve, by which the blastpipe is affixed to the trunnion of the converter shell. In order to allow the shell to be raised or lowered on the stand without striking the blastpipe this latter swings on the gooseneck as a centre, its motion being controlled by a screw which is fastened to an upright I beam. The rise of the blastpipe above the trunnion serves to prevent the matte surging back into the blastpipe in event of any accident to the blowing engine or to the electric motors. Below each of the Dyblie valves on the wind box a fusible plug is provided for the same purpose. In the old building one or two occasions a lightning flash threw off both the current and the blast at



LEGEND.—Fig. 1—General Plan. Fig. 2—Section through Pug Mill and Bin Department. Fig. 3—Section through Converter Room. Fig. 4—Section through Relining Department.

1—Furnace Building. 2—Converter Room. 3—Relining Department. 4—Pug Mill and Bin Department. 5—Crushing and Drying Department. 6—Slag Casting Machine. 7—Slag Bin. 8 and 9—Pulpits. 10—Relining Platform. 11—Wood Platforms. 12—Relining Tracks. 13—Wood Tracks. 14—Quartz Track. 15—Clay Track. 16—Sculing Tracks. 17—Matte Transfer Tracks. 18—Furnace Charge Tracks. 19—Converter Stands. 20—Converter Stack. 21—Shell Drying Stacks. 22—Casting Moulds. 23—Lining Bins. 24—Pug Mills. 25—Converter Flues. 26—Travelling Crane. 27—Jib Crane. 28—Converter Slag Tracks. 29—Escalator.

The converter blastpipe, 3 feet in diameter, is carried on steel trestlework at a height of 19 feet across the yard from the substation to the southeast corner of the converter building, where it turns at right angles and is carried at the same height under the shed roof behind the pulpits. At each pulpit a 24 inch branch is led off to a manifold in the base of the pulpit, from which five 12 inch cast iron pipes are led underground, one to each of the five converters operated by this pulpit. The stem of the quick-opening gate valve in each pipe is brought up through the floor of the pulpit and ends in a rack which engages a pinion on the shaft of a sprocket wheel. The chain of this sprocket wheel passes round a controlling hand wheel at the front of the pulpit. Two turns of this hand wheel raises or lowers the gate valve in the blastpipe below. At the converter this cast iron pipe ends in a

the same time, and the sudden rush of matte into the wind box plugged up the blastpipe. The new arrangement prevents this accident. The wind box also is situated above the tuyeres, the latter being connected individually to its under side. This arrangement also tends to prevent any matte getting into the wind box.

The motion of the converter is controlled by a 30 h.p. induction motor directly connected to a worm gear. The wires for each converter are led in ducts from the pulpits. An electric button on the wall opposite each converter actuates a bell and annunciator in the pulpit, so that no mistake can be made as to which converter is to be turned up or down.

The tread ring on these converters is continuous, so that the shells can be completely revolved on the stands. This does away with the possibility of breaking the wind box and also allows the blast to be deliv-



ered at any desired angle under the matte. Hence there is much less sloppage of the charge and less converter scrap to be rehandled in the furnace.

The furnace matte is tapped from the settlers in the furnace building into steel pots protected by a thin clay lining of slag. It is lifted by the crane and set on one of the transfer cars, which are hauled across to the converter building by an electric motor and cable. In the converter building two Morgan electric cranes handle the matte to and from the converters and the shells to and from the lining stands. These cranes have 50 ton main and 20 ton auxiliary hoists. The crane span is 55 feet 8 inches from centre to centre of the rails, and the lowest point on the crane is 35 feet from the floor. The crane travel is 200 feet per minute, and the speed of the main hoist is 18 feet, and of the auxiliary is 36 feet per minute.

The converter slag is poured into pots, which are hauled to the slag casting machine by a light locomotive. The slag cars carry 5,000 lbs. apiece. The slag casting machine is at the north end of the converter building, and 50 feet therefrom. It was built from the designs of the Tacoma Smelting Company, with some minor changes. It consists of two circular angle iron rings 59 feet inside and 66 feet outside diameter, supported on axles four feet apart and rotating on a circular track. In the annular space between the inner and outer circles rest 144 cast iron moulds, each overlapping the next. This ring rotates in 10 minutes, and the moulds will hold approximately 10 tons of slag. The moulds are automatically dumped into one of two skips, in which a spray of water is played. These skips are raised by an electric hoist on an inclined track and dumped into a steel bin, from which the slag is discharged into the furnace charge cars as desired.

When a shell is burnt out it is lifted from the stand and placed on a sculling car, and the top is lifted off. Four sculling tracks are laid at right angles to the building and run from the outside edge of the shed twelve feet under the crane span. In the shed are provided platforms the height of a flat car floor. The sculling cars are hauled out by a cable and motor to these platforms, the lining is cooled, and the adhering slag and any loose lining broken out and thrown on these platforms. The cars are now run back and the shell lifted to the relining cars beside the relining platform.

The relining platform is 112 feet long, 20 feet wide and 10 feet high. It projects down the centre of the crane runway above the lining tracks, which pass underneath at right angles to the platform. Six tracks thus allow 12 shells to be under lining at one time, six at each side of the platform. The platform itself is of steel, with a concrete floor, and carries two 24 inch tracks, on which the lining material is trammed from the pugmills to the shells.

The shells to be relined are set down by the crane on cars on either side of the relining platform. The top of the lower section of the converter shell comes flush with the top of the platform and about 18 inches away from it. A sheet iron apron is laid between the edge of the platform and the shell to prevent the lining material from falling on the tracks below. The material for lining the shells is wheeled from the pugmills in small steel cars with a swinging body and end dump, so that the lining is piled on the floor near the edge of the platform. This is shovelled by one man into the shell, where two men guide the ramming ma-

chine. After the bottom of the shell has been levelled up to two inches below the tuyeres the centre mould is put in position and the lining carried on up to the top of the shell.

The ramming machines are made in the company's shops, and consist of a somewhat modified rock drill mechanism, without the feed screw and rifle bore. The cylinder has a heavy cast iron jacket. The whole machine weighs 525 lbs. This extra weight absorbs the shock of the stroke, and prevents the machine from dancing. The machine is hung from a jib crane by a trolley chain block. This gives free motion horizontally and a quick and positive vertical adjustment.

After the bottom is finished the tops, which have been lined on a separate car and partially dried, are put on the shells, the joint being made tight by a layer of soft clay and quartz mixture, which the weight of the top squeezes out into all the crevices. The lining cars are now moved out under the drying hood and beside the wood platform.

The cordwood for drying the converters is brought in on flat cars under the shed roofs at both sides of the relining department. The wood is thrown on two platforms 12 feet wide and 10 feet high. These platforms serve to hold several days' supply of wood.

The converters come directly under hoods 16 feet apart, which hoods open into two flues 4 feet wide and 5 feet high. These flues lead to two stacks 5 feet in diameter and 75 feet high, which carry off the wood smoke during the drying of the shells. The tuyeres of the converters are pricked through the lining when the centre mould is in position, and also during the drying operation.

After 15 hours' firing the converters are moved back under the crane runway and placed on the stands. Here they are turned down and the tuyeres pricked out again, and the hood is swung out by the crane and locked in position.

With a new shell the first tap is small, about 1 to 1½ tons. This is blown about 20 minutes, and the slag is skimmed. The second tap 1½ to 2 tons is put in on top of the charge and the blow continued about half an hour, when the slag is skimmed again. The third tap about 3 or 3½ tons is now put in and blown for half an hour, skimmed and blown again till all the slag is "up," which means that the iron is practically oxidized. This last slag is skimmed, and the finishing blow of about 10 minutes is given. This granulates the slag so that it remains behind in the converter. The matte is now cast, and this ends the first blow.

The second blow starts with about 3 tons of furnace matte, which is blown about 50 minutes, then slag is skimmed and another tap of 3½ tons is put in and blown say 50 minutes, skimmed, blown again about 25 or 30 minutes till the slag is up, and then blown 10 minutes to finish after the slag is skimmed. The matte is now cast.

The third blow starts with a full ladle of about 6 tons. This is skimmed twice and blown to a finish.

The fourth blow is the same as the third, using a full ladle of 6 or 7 tons of furnace matte.

One lining will average about 4 casts, 8 taps, and 7 hours blowing time, producing about 6½ tons of Bessemer matte, according to the grade of matte from the furnace.

One lining requires about 4 tons clay and 8 tons quartz. This clay includes all supplied to the furnaces for matte chutes and budding clay, which comes back ultimately to the old lining bin. The quartz carries



about 93 per cent. silica, with no copper or precious metals, while the clay is a local silt containing about 60 per cent. silica. The Bessemer matte contains 80 to 81 per cent. copper nickel, 16 to 17 per cent. sulphur, and  $\frac{1}{2}$  to 1 per cent. iron, the balance being oxygen and a small amount of converter slag. This matte is poured by the crane into stationary ladles, which stand on concrete piles at the north east corner of the converter building. A hole in the side of these ladles close to the bottom allows the matte to flow out through clay-lined chutes into cast iron moulds. These moulds are sectional, each section being 2 feet by 5 feet, with a lip or edge 4 inches high. Twelve of these bolted together form a continuous mould, holding about 3 tons of matte.

When this is cold it is pried up by crowbars on one edge and pipe rollers are slid underneath. The cake of matte is now easily rolled out on a cast iron floor, broken, loaded into barrows and weighed. The barrows are wheeled to an escalator behind No. 1 pulpit, which carries them to a platform level with the matte car floor.

The quartz and clay bins lie immediately behind the relining platform, as shown in the plan. The bins are of  $\frac{3}{8}$  inch plate, and of the suspended catenary type. These are in two rows, one on the east, the other on the west side of the building. Each row is really one continuous bin, with vertical plate partitions. The total length of each row is 60 feet, and the depth 22 feet. These are subdivided so as to form on each side one large bin for quartz and two small bins, one for clay and one for old linings. The bins will hold 800 tons of quartz in all, and about 500 tons of clay.

There are 8 chutes under each bin row. These chutes are directly over 24 inch tracks, on which run small plate iron end dump cars. These cars shuttle back and forth under the bins and bring the quartz and clay to the pug mills. The concrete platform on which these cars run is 5 feet above the platform on which stand the pug mills. In this way the material can be dumped directly from the bin cars into the mills, while the mill plows can throw the mixed material into similar cars on the lower platform, thus avoiding any shovelling.

At present the pugmills are as follows: One 6 foot under-drive Allis-Chambers mill, belt driven, by a 30 h.p. induction motor; one 6 foot heavy type Power

and Mining Machinery Co.'s mill, over-drive, belt-driven, by 30 h.p. induction motor; one 7 foot over-drive Carlin mill, belt-driven, by a 35 h.p. motor.

All the motors for these mills are lodged in a dust-proof room overhead, but all the controllers are arranged beside each mill. Space is provided for the addition of three more mills as they may be required.

The quartz crushers, clay driers and elevators are directly behind the bins at the south end of the building. The quartz comes in on a track parallel with the west side, and the clay on a track parallel with the east side of this department. Both are unloaded on platforms as high as the car floor.

The quartz is shovelled into a Gates crusher No. 4 K, which has a capacity of 10 or 12 tons per hour crushed to  $1\frac{1}{2}$  inch size. This crushed quartz falls into an elevator boot, from which it is lifted to a screen 10 feet long, with  $\frac{3}{4}$  inch holes. The fines from this slide directly into an elevator boot, while the coarse passes through an Allis-Chambers 30x14 roughing rolls, crushing to  $\frac{3}{4}$  inch, and then drops to the elevator. The quartz is now hoisted to a distributing chute 47 feet from the floor. A system of gates in this allows it to fall through chutes on either belt and drop into any bin desired.

The distributing belts are 14 inch rubber-faced, and convey the material at an incline of 20 degrees. Stationary trippers are provided at each bin, so that the material can pass over any bin or drop at any point required.

The clay is unloaded on a platform, and in the summer wheeled directly up an incline and dumped on the concrete floor behind the pug mills. In the fall and winter, however, when it comes in frozen in lumps, it is passed through a Jeffrey coke sizer and then shovelled into the clay drier. This is built by Ruggles-Coles, and has a capacity of about 4 tons per hour, and is 30 feet long and 70 inches diameter.

The flame from the firebox passes down a central pipe and then back through the annular space in which the clay rotates. The machine both dries the clay and rolls it into pellets before it is delivered to an elevator and passes to the distributing belts.

The clay drier is driven by a 15 h.p. motor, and the quartz crusher rolls and elevators by a 66 h.p. motor. These are housed in a room on the same floor as the pug mill motors.

## FIELD WORK OF THE GEOLOGICAL SURVEY OF CANADA.

The distribution of the parties was as follows:—

### Yukon and Mackenzie.

Mr. D. D. Cairnes, assisted by Dr. O. Stutzer, was engaged in the Tantalus district, near White Horse, defining the coal area, with the object of determining the character of the coal and discovering the point nearest transportation where a commercial supply exists. Mr. Matheson had charge of the topographical work in connection with this investigation.

Mr. V. Stefansson descended the Mackenzie, and will winter with the Eskimo in the Arctic. The expedition, which is sent out by the American Museum of Natural History and the Geological Survey conjointly, while primarily for ethnological purposes, is expected

to add to the geographical knowledge of the Arctic coast. In addition, an endeavor will be made to obtain information regarding mineral occurrences. Mr. Stefansson took with him a set of ore specimens to assist him in eliciting information as to ore occurrences from the natives, who are good observers in this respect.

Mr. Joseph Keele, who wintered on the divide at the head of the Pelly River, continued his exploration across to the Gravel River, and descended this stream to the Mackenzie.

### British Columbia.

Mr. R. G. McConnell spent the season on Texada Island prosecuting a somewhat detailed geological survey of the northern part of the island. The copper and



iron deposits here are attracting attention, and it was in response to an urgent appeal for a geological survey of the island that this work was undertaken. Mr. F. Maclaren was engaged in a topographical survey of the same field as a foundation for the geological map.

Mr. R. Graham continued the survey of the Pacific coast and inlets begun in 1906 by Mr. Leroy and continued in 1907 by Mr. Bancroft. The work this season was the section between Kingscome Inlet and Bella Coola.

Mr. W. W. Leach continued his explorations in the Bulkley Valley near the route of the Grand Trunk Pacific. Coal, copper and lead prospects and the advent of transportation facilities make this field of importance.

Mr. C. H. Clapp, assisted by Mr. Kenneth Chipman, commenced a survey of Vancouver Island.

Some work had been done by the Survey in the Nanaimo coal areas in the 70's. The northern end of the island was studied by Dr. Dawson in 1886, and a few of the inlets of the west coast in 1902, but for the most part the geology and topography of the island is unknown to the Survey. From an agricultural as well as from the mining standpoint the island is rapidly increasing in importance, and it was decided to begin its systematic survey. Mr. Clapp made the start at the southern end of the island as affording the most favorable opportunities for geological investigation.

Mr. John Macoun, assisted by Mr. W. Spreadborough, naturalist to the Survey, was engaged making a representative collection of the fauna and flora of the island for the new museum. Mr. C. Roberts, one of the preparators of the Survey, was stationed at Nanaimo, mounting the fresh specimens.

Mr. Macoun was also instructed to visit the Rossland mines for the purpose of studying the fungi, whose growth in mine timbers causes their rapid destruction, entailing a heavy expense upon the mines. The object of this investigation was to discover, if possible, a commercial method of preventing their growth. On a later page will be found an account of a cheap method of preserving the timbers kindly furnished me by Mr. Watson, of the visiting British engineers, with whom I discussed the problem.

Mr. Charles Camsell completed his detailed study of the Hedley mining camp, and began a survey of the Tulameen district. The latter is unique in that it is the only district in Canada where platinum gravels have been worked on a commercial scale. Railway facilities for this section are projected, and with the solution of the transportation problem it is expected that this portion of the country will receive active development. The present work is in anticipation of this.

Mr. L. Reinecke was engaged in the topographical surveying of the districts examined by Mr. Camsell.

Mr. W. H. Boyd was employed on a detailed survey of the Phoenix camp. At the close of the season he made a hasty examination of the Slocan district to plan for its survey next season.

Mr. O. E. LeRoy made a detailed investigation of the Phoenix camp and its ore deposits. After finishing this he spent a month on the underground geology near Sandon.

#### Alberta.

Mr. George Malloch made a geological and topographical survey of the Bighorn coal area on the Brazeau River. Coal in quantity and of exceptional quality is found here.

#### Alberta and Saskatchewan.

Mr. Dowling was engaged in investigating the coal supply of various portions of Saskatchewan and Alberta.

#### Saskatchewan and Keewatin.

Mr. W. McInnes spent the season on surveys from Lac la Ronge down the Churchill to South Indian Lake. The prospect of a railway to Hudson Bay has created a demand for information concerning this north country and its mineral possibilities. The Survey had no information concerning this section of the Churchill, although the upper and lower portions had been explored. To fill the gap this work was undertaken. Reported discoveries of valuable minerals at Lac la Ronge made exploration of that region important.

#### Keewatin.

Mr. Owen O'Sullivan completed the instrumental survey of the shores of Hudson Bay. A section of 250 miles remained undone, and as so much interest now centres round Hudson Bay, it was deemed advisable to complete its survey.

#### Ontario.

Mr. A. W. G. Wilson spent the field season about Lake Nipigon, completing the geological work necessary for the map of this region, which the National Transcontinental will open up.

Mr. W. H. Collins made a geological examination of the upper part of the Montreal River. The lower portion of this river received much attention from prospectors last year, and it was hoped that geological information would be secured regarding the upper country before it would be required by the advancing prospectors.

Mr. W. A. Johnson continued work on his Simcoe sheet in Southern Ontario.

Mr. F. B. Taylor and Mr. Goldthwaite, who have been for some years working on the superficial geology and the history of the Great Lakes region for the United States Geological Survey and for State Surveys, extended their studies into Ontario, under the auspices of the Geological Survey of Canada. Mr. W. A. Johnson co-operated with them in this work.

Mr. E. D. Ingall spent his field season in the gas and oil region of Southern Ontario, obtaining information for a new map of the productive districts.

#### Quebec.

Mr. M. E. Wilson, who had been studying the country east of Lake Temiskaming during the past two seasons, was this year engaged in extending this work northward in Quebec. Considerable prospecting is being done in this region east of Larder Lake on the Quebec side of the interprovincial line.

Mr. W. H. Boyd, with a party of topographers, spent a few weeks on a map of St. Bruno Mountain, required for Mr. Dresser's report on the geology of this old volcano.

Mr. J. A. Dresser in the early spring examined the recent gold discoveries in Megantic, and issued a preliminary report on this field. Mr. E. R. Faribault also visited this district and contributed a sketch map for the report. Mr. Dresser's main field work was along the National Transcontinental Railway in Eastern Quebec, which will open up a district about which the Survey could furnish but meagre information to the numerous enquirers.

Mr. R. W. Ells investigated and reported on the landslide at Notre Dame de la Salette.



Mr. W. McInnes, and later Mr. H. M. Ami, made brief visits to Bergeronnes, on the Lower St. Lawrence, to examine the condition of the clay banks in its vicinity, as the inhabitants were in some apprehension of slides.

#### New Brunswick.

Mr. G. A. Young was occupied during the field season in a detailed survey of the Bathurst district. The iron ores of this district are receiving attention, and the Survey had been petitioned to make a detailed study of the local geology.

Mr. R. W. Ells was commissioned to go to Scotland to report on the important oil shale industry of that country, and on his return to examine the Albert shales of New Brunswick with a view to determining their possibilities as a basis for a similar industry in this province.

Mr. L. Lambe, vertebrate palaeontologist, was engaged in collecting Devonian vertebrates in New Brunswick and Nova Scotia, chiefly in Albert County, N.B., and Kings County, N.S., to secure palaeontological evidence regarding the geological ages of the formations believed to be or which might possibly be Devonian. In the Maritime Provinces, where economic materials such as coal occur in definite geological horizons, such work is of great economic value.

Mr. W. J. Wilson made collections along the Bay of Fundy, paying special attention to plant remains.

#### Nova Scotia.

Mr. Hugh Fletcher continued work on the map sheets of parts of Cumberland, Kings and Annapolis Counties. Geological work in this section is of extreme importance on account of questions as to the continuity of the coal measures.

Mr. E. R. Faribault was also engaged in extending the surveys on his map sheets in Lunenburg County and Kings County, covered by the Gaspereau River, New Ross and Chester Basin sheets.

Mr. H. M. Ami spent a portion of the summer in Antigonish to determine the horizon of carboniferous rocks near Big Marsh, which the Survey had mapped as lower carboniferous. The presence of bituminous shales (which in places pass into coal) in these rocks had led a number of local people to hope that the rocks

would be found to belong to the coal measures. Mr. Ami also collected fossils from several Nova Scotia localities.

#### Prince Edward Island.

The work of the Survey in Prince Edward Island took the form of deep boring operations to determine the depth at which the coal measures occur, and, if possible, to prove the presence or absence of coal seams within working distance from the surface.

Outside his office duties, Mr. Brock spent a few days at Cobalt, made two visits to Prince Edward Island in connection with the boring operations, made an official trip with the Minister of Mines through Southern British Columbia, accompanied the mining engineers throughout the western portion of their excursion, visited several of the field parties at work in British Columbia, and spent some weeks in the Slocan, the Sheep Creek gold district south of Nelson, and in Rossland.

The growing interest in and use made of the work of the Survey is shown by the increasing demand for Survey publications. Over twice as many publications were asked for and distributed the past year as were called for the year before; many reprints have to be made of the more valuable reports, and a large increase made in the regular editions of Survey reports.

A topographical division of the Survey is being organized under the supervision of a topographer.

A well records division has been organized to collect, preserve and publish the information to be gained from boring operations throughout the country. Very valuable geological information, bearing on the stratigraphy, and on problems connected with oil, gas, salt, water, etc., is to be obtained from such borings, and it is of the highest importance to both scientists and practical operators that such information be preserved and rendered available. Sample bags, log books, etc., are sent to them to be filled, and these can be mailed to the Survey free of charge. Everything will be done to make their part of the work as little burdensome as possible. With the active assistance in this matter of the drillers, who stand to gain most benefit from this work, this division should become one of the most useful parts of the Survey organization.

## TECHNICAL EDUCATION IN NOVA SCOTIA IN 1908.

By Director F. H. Sexton.

The year that has just been brought to a close has seen the successful termination of the first year of the system of evening technical schools under the new Department of Technical Education, beside the opening of these schools on their second year and the construction of the Nova Scotia Technical College in Halifax.

A cut of the college, as it stands to-day, is included in this brief article. The outside of this 150 x 90 building is completed, except for the main entrance, and the pillars on each side, and the central pediment above the pillars, on which the name of the college is inscribed. This building will contain the lecture rooms, assembly hall, scientific laboratories, Provincial Science Library, the Provincial Museum, and administration offices. The workshops, power and heating station, hydraulic laboratory, mining, and metallurgical laboratory and mechanical and electrical engineering laboratory will be in buildings of factory type, separate

from the main college building. The college structure is of Nova Scotia red pressed brick with Wallace freestone facings. It has a steel frame and is of slow-burning reinforced concrete construction. The interior is now being finished and will be ready for occupancy by the end of May.

The Technical College is in a strong affiliation with all of the Nova Scotia colleges, four in number, and with Mount Allison University in New Brunswick. The Governing Board of the college is composed of one representative from each of the affiliated colleges, together with the Director of Technical Education.

At a meeting in June, the Governing Board adopted a uniform two-years course to be carried out in the affiliated colleges, and to be recognized as the first half of a four years engineering training. This two-year work contains the general mathematics, science, language, drawing, work-shop, etc., that can be easily car-



ried out by the affiliated colleges, without much additional staff or equipment over what they possess at present. The last two years of professional work in engineering are to be carried out in the Technical College, thus avoiding duplication of effort and equipment in all the colleges, if each attempted to carry out the full work for degrees in engineering. Equipment and instruction in the Technical College will be provided for the basal departments of civil, mechanical, electrical and mining engineering. Short courses will be provided in mining for colliery managers, in civil engineering for road inspectors, in mechanical engineering for firemen and steam engineers, etc. These short courses are necessary, in order to serve the province with the educational needs that are so apparent in the industrial circles.

In establishing a system of technical education, the government in Nova Scotia realized that they had to provide for both the youths that were about to become wage-earners and also those who were already engaged in the industries. The government thought that their

for a knowledge of electricity and for the ability to read working drawings. Steam engineers, who are most capable in their own line, see some electrical machine introduced suddenly into the plant over which they have supervision, and are more or less at sea because they have not had any fair chance to learn the principles and modes of operation of dynamo-electric machinery. To make the teaching in this subject effective, considerable electrical apparatus and a number of motors, dynamos, etc., were purchased and a laboratory started in each place so that the men may work with the actual machines, in addition to class-room work.

The coal mining schools aim to instruct miners in the science and art and modern practice in this difficult branch of industry. There is an evening school in practically every colliery town in Nova Scotia—some twenty in all. Day classes are held in the larger towns for men who work on night shift. The teachers, with the exception of a few assistants, are men who are best fitted by training and long practical experience to act



first duty was to raise the skill, efficiency, and productive capacity of those already in the trades as much as can be done by education instead of training more men for the trades. Therefore, they started a comprehensive system of evening schools.

The evening technical schools under the direction of the Department are of three distinct classes: Engineering Schools, Coal Mining Schools, and Technical Schools. The first two kinds are confined to the colliery districts and the last mentioned to manufacturing centres.

Engineering schools are maintained in the large centres and instruct firemen, engineers, and mechanics in the elementary scientific principles and modern practice in steam and mechanical engineering. This year classes in mechanical drawing, machine drawing, electricity and dynamo-electric laboratory have been established in connection with the engineering schools, and have been very well patronized. Men working about power plants find every year more and more necessity

as instructors. Every one had several years of underground experience of varied character and had risen to some position of responsibility. Each instructor gives his whole time to teaching, holding classes two nights a week in each of three places in his district, and holding day classes wherever there is a large enough number of students to warrant it. Assistant instructors from the colliery officials who work in the day time are appointed to hold classes in the smaller places more remote of access.

To enter the coal mining classes, as well as the engineering classes, the student must by examination prove that he is proficient in arithmetic through fractions and decimals, and that he possesses a good working knowledge of English composition. In coal mining towns, however, there is more than the usual tendency for boys to leave school just as soon as he is allowed by statute. Because of neglect or limitation of earlier educational opportunity, many older men, desiring a greater knowledge of the underlying principles of ven-



tilation, mechanics, modes of work, etc., find they have no basis upon which to advance to the desired goal. For this reason preparatory evening classes in arithmetic and English are carried on in every locality where the more technical classes are held. In the larger centres these are divided and graded in two, three or four sections according to the number of pupils. A number of men attend these more elementary classes who merely wish to improve their general education, which was of very limited extent when they were young. In some of the smaller sections where the evening schools are of the most benefit and hard to maintain on account of the small number of students, the public school trustees are anything but generous in their attitude toward the provincial government which bears the total expense, while most of the larger towns co-operate generously.

The attendance at the coal mining schools is large and the students are in earnest. Some of the mathematics in connection with theory of ventilation and machines is very difficult, and it is wonderful what great assiduity is displayed and the remarkable grasp of the subjects attained by some of the students who cannot work ordinary fractions when they begin in the schools. Most of the Nova Scotia coal miners are native born, are most intelligent and work under the best of conditions. The hours of labor are comparatively short for most of the men, and the evening instruction is not the tax on their powers that it is on men who do not have time for a good rest between the time they stop work and the time they go to school. There is no doubt but that the general diffusion of the knowledge of the principles underlying the processes employed in the mining of coal will do much to make a more intelligent, alert, responsible miner and will be a great safeguard against such disastrous catastrophes as are becoming alarmingly common in the United States of late. So far as the author knows this is the only local government (Provincial or State) in America that has a system of secondary mining education, generally applied over the whole domain.

The last kind of evening school is the evening technical school established in the various larger manufacturing centres. There are at present four of these, viz., Halifax, Amherst, New Glasgow, and Sydney. In each place they are conducted in the public school buildings. The Provincial Government bears practically all the expense of the coal mining and engineering schools, but in the evening technical schools provides one-half the cost of instruction and furnishes the necessary apparatus, while the locality is required to supply the other half of the cost of instruction, besides the rooms, heat, light and janitor attendance.

Such courses are given as will teach the men in different vocations the drawing, science and modern practice connected with those vocations. The number and kind of courses offered in any locality depend on the number of students available and the dominant industries. There are some classes, such as Practical Mathematics, Mechanical Drawing, and Electricity, etc., that are demanded in every centre, and then there are others, such as Metallurgical, Chemistry, Pharmacy, etc., that are dependent on the size of the locality and the special industries.

These classes are not entirely free. An experiment was tried on the establishment of the schools to attempt to insure a constant attendance. During the first four sessions of any class, the student is required to make a deposit of \$2.00 to \$4.00, depending on the

class. This deposit is kept until the end of the year, when it is refunded according to the attendance. The refund is made on the following basis:

- 100 per cent. attendance—whole deposit returned.
- 90 to 99 per cent. attendance—four-fifths deposit returned.
- 80 to 90 per cent. attendance—two-thirds deposit returned.
- 70 to 80 per cent. attendance—one-half deposit returned.
- 60 to 70 per cent. attendance—two-fifths deposit returned.
- Below 60 per cent. attendance—none of the deposit is returned.

It was feared on one hand that the deposit might keep some students away, and on the other hand that it was not large enough to act as a strong incentive to attend regularly. Both fears were proven to be groundless.

The attendance was remarkably constant, in some classes averaging 84 per cent. for the whole year. Many students also received the whole deposit back for 100 per cent. attendance.

The courses offered in these schools are as follows:

- Practical Arithmetic.
- Business English.
- Practical Algebra, Geometry and Trigonometry.
- Mechanical Drawing.
- Machine Drawing.
- Machine Design.
- Architectural Drawing.
- Building Construction.
- Architectural Design and Estimating.
- Elements of Electricity.
- Elements of Electrical Engineering.
- Power Plants and Electrical Transmission.
- Electrical Laboratory.
- Electrical Engineering.
- Elements of Chemistry.
- Technical Chemical Analysis.
- Elements of Surveying.
- Surveying and Plotting.
- Elements of Civil Engineering.
- Pharmaceutical Chemistry and Pharmacy.

It was found necessary after the first year's experience to supplement the recitations and class lectures with laboratory method, especially in electricity. The practical men in the classes needed concrete illustrations even more than ordinary school pupils. About \$10,000 was expended in the purchase of electrical apparatus, machines, and measuring instruments, and a small dynamo-electric laboratory started in connection with each of the four schools.

The different technical subjects are now so arranged that each may be followed for three years in successively advancing classes. By obtaining a pass-mark of 75 in each of the three classes, and the same standing in the general subjects of Practical English, Practical Arithmetic, Algebra and Trigonometry, Practical Geometry, the student is entitled to a full diploma, the highest honor in the schools at present. A diploma would be given, for example, for satisfactorily passing the following group: Practical English, Practical Arithmetic, Practical Geometry, Algebra, Trigonometry, Mechanical Drawing, Machine Drawing, and Machine Design.

To make these classes a success the department has been forced to supply the classes with all draughting



supplies at reasonable prices, owing to the fact that most of the classes are situated in places where these supplies are not at all available. The text-books of most of the subjects taught, were found to be far from suitable, and the department has been compelled to start publishing texts for its own peculiar needs. So far the only one issued has been a book on "Practical English," but a course in Mechanical Drawing and another book on "Mathematics for Coal Miners" are in preparation.

The total numbers registered in the different schools last year are as follows:

|                                 |       |
|---------------------------------|-------|
| Engineer Schools .....          | 231   |
| Coal Mining Schools .....       | 649   |
| Evening Technical Schools ..... | 429   |
|                                 | <hr/> |
|                                 | 1,309 |

The numbers this year have not increased as much

as was expected, because the opening of the schools was much hampered by the intense political excitement that prevailed this autumn, especially in the industrial centres.

An evening Technical School for Fishermen, carried on in connection with the Dominion Department of Marine and Fisheries, is to be opened soon after the first year of the year. A movement on foot that is meeting with universal commendation so far is to establish at Halifax a day and evening trade school for women and girls. In it will be taught courses in millinery, dress-making and domestic economy. It will aim to train thoroughly those women, that have to resort to gainful occupations from necessity, for trades and domestic necessity.

The work of technical training in Nova Scotia is moving slowly, sanely, and surely, backed by a sturdy intelligent people, who have a reputation for possessing both desire and reverence for all education.

## THE REPORT OF THE GERMAN DEVELOPMENT COMPANY, LIMITED.\*

### I.

1907.

**Report on Mining Claims in the Montreal River Mining Division, by Alfred E. Barlow, M.A., D.Sc.**—In August, 1906, Dr. Barlow first directed the attention of his principals to the Rabbit and Ko Ko Ko Lake areas. Diligent prospecting brought only negative results. A short campaign in the vicinity of Maple Mountain was also fruitless. The lateness of the season then rendered it imperative that a concession near Makamik Lake, in the Province of Quebec, be examined before snow fell. No veins worth staking were encountered here.

During the winter of 1906-07 an expedition under Mr. Albert Scott was sent out to explore the country in the vicinity of the Transcontinental Railway between Abitibi Lake and Bell River. Despite glowing accounts that had been received concerning the commercial possibilities of this region, especially regarding timber and pulpwood, Mr. Scott's report indicated nothing to justify the investment of capital.

Late in the summer of 1906 persistent rumors were current to the effect that cobalt, nickel, and silver had been found near the Montreal River, in the neighborhood of Maple Mountain and James Township. Throughout the winter promiscuous staking went on. For miles in and about James Township territory was staked. Most of the claims were recorded without discovery. Consequently over 90 per cent. of the claims thus staked were thrown out by the Government inspectors, only to be re-staked and recorded again. Dr. Barlow estimates that at the beginning of June, 1907, there were more than 3,000 prospectors working in the country drained by the Montreal River and its tributaries, a territory including parts of the Townships of James, Smythe, Tudhope, Mickle, and Farr, covering an area of 40 square miles. The centre of the area is about 35 miles northwest of Cobalt.

During 1907 the land, or winter, route started from Earlton, on the T. & N. O. Railway, crossing the northern parts of the Townships of Armstrong, Beauchamp,

Bryce, and Tudhope, to Elk Lake, opposite the mouth of Bear River, in the fifth concession of James Township. Seven miles of this 30 mile trail had then been converted into a wagon road. The water route from Latchford to Bear River, 50 miles, broken by three rapids, was traversed by two lines of steamboats. The stages of the journey, which was then completed in not less than 12 hours, are:—

Latchford to Pork Rapids, 9 miles.  
Pork Rapids to Flat Rapids, 27 miles.  
Flat Rapids to Mountain Chute, 3 miles.  
Mountain Chute to Bear River, 11 miles.

Physically, the district presents an uneven rocky surface, with intervening valleys occupied by swamps and lakes. Only low hills vary the scenery. Outcrops of rock are frequent on the higher ground, but much of the area is drift covered.

All of the ore bodies in the district occur as veins cutting a quartz-diorite or gabbro. Most of the veins occupy two sets of fissures running approximately north and south and east and west, respectively. The fissures are regarded as contraction cracks formed by the cooling laccolith and filled by later and more acid secretions of the same magma from which the accompanying diorite has solidified.

"The vein-filling must therefore be regarded as of pegmatitic origin, having the same genetic relationship to diorite that ordinary pegmatite does to granite. For purposes of discussion and correlation it may therefore be referred to as diorite-pegmatite in preference to the term "Aplite" by which the material in these veins or dikes is now known to the prospectors of the Montreal River district, for the latter would imply the formation of this material as a differentiation product of granite. As a rule these veins are more or less irregular, often curving, sometimes faulted, but surprisingly persistent over long distances. The fissures which they occupy vary from a fraction of an inch or a mere crack to two feet or even more in width. Very frequently too the same vein may show an equal variation in width

\*See editorial in issue of January 1st, 1909.





by him, representing several of these veins from the western part of Tudhope and the central part of James Township, by far the largest proportion at least was plagioclase varying in composition from albite through oligoclase to andesine. This diagnosis was corroborated in part by a separation of the mineral constituents by means of a heavy solution. The plagioclase thus separated varied in specific gravity from 2.609 to 2.635. Some of this plagioclase (albite) had distinct rectangular or lath-like outlines, showing twinning according to both the albite and percline laws, which in certain cases produced a fine "cross-hatched" structure usually considered characteristic of the appearance of microcline between crossed nichols. Most of the grains are quite turbid. Another species of plagioclase (oligoclase) occurs in irregular, untwinned and clear grains, thus resembling quartz, but unlike quartz this mineral is readily fusible. Some of these veins contain a considerable admixture of quartz, this mineral often forming graphic intergrowths with the feldspars. In certain of these cases, the feldspar has acted as the host, but in others large grains of quartz were noticed containing only a few shred-like individuals of the plagioclase. Calcite is usually present and sometimes very abundant. This mineral frequently occurs in fairly large grains or in granular aggregates made up of several individuals disseminated through the more abundant feldspathic material. It also occurs in more or less continuous vein-like areas or masses, anastomosing between and sometimes penetrating through both simple and composite individuals of feldspar. Portions of the vein where exposed to the action of the weather or percolating waters, frequently present a finely cavernous or sponge-like appearance, due to the etching and removal of the calcite, leaving small and irregular shaped miarolitic cavities lined with minute tabular crystals of feldspar. Oxidation of the iron sulphides usually present gives a prevailing pale brownish to an almost black color to these portions of the vein. Not infrequently barite, usually pale pink in color, and occasionally celestite occur with or replace altogether the calcite and feldspar.

"Some of these veins are therefore made up almost wholly of red feldspar, almost always a plagioclase near the acid end of the series, together with a very subordinate amount of calcite and a still smaller quantity of quartz. Other veins again are made up of an almost equal proportion of plagioclase and calcite and sometimes quartz, while still other veins present a finer grained feldspathic portion in the vicinity of the walls, with the whole mass of the interior made up of comparatively coarse grained calcite with sometimes a small proportion of quartz. The stages represented completely by these vein occurrences in these districts show a perfect and practically uninterrupted continuity during their consolidation from an original condition of hydro-igneous fusion characteristic of the magma from which the comparatively fine and even grained feldspathic material is believed to have resulted, to conditions of igneo-aqueous solution which must have obtained in the viscous mass from which the latest calcite or quartzose segregations had solidified.

"Chalcopyrite is the most abundant and common of the metallic constituents, but bornite is also very frequently encountered, both of these sulphides often occurring side by side in the same vein. Covellite also occurs, but much less frequently. Galena is also very common, and usually carries silver in variable quantity. Many of the veins contain micaceous or specular iron

ore (hematite), and some of them are entirely made up of this material, at least near the surface. Several veins were noticed made up of alternations of chalcopyrite and specular iron ore. Very frequently a vein containing specular iron ore is replaced at a depth sometimes of only a few feet by chalcopyrite, smaltite, and native silver. In the Hubert Lake area veins of magnetite have been found, similar to those of hematite in the Township of James. Malachite and azurite are both common. The cobalt minerals, either smaltite or cobaltite, are very prevalent usually in association with more or less niccolite. Erythrite (cobalt bloom), and annabergite (nickel bloom) are also frequently present as surface decomposition products. The smaltite-niccolite veins often contain the white bloom near the surface, which is formed by the reaction of these minerals upon one another when subject to weathering processes. Most of these veins will give assay values in silver varying from a fraction of an ounce to thirty ounces or even more per ton, although the material on which the trials were conducted showed no signs of the native metal.

"Silver is also of common occurrence in these veins, both in the native state and as argentite (sulphide of silver). As native silver it occurs in nuggets of various shapes and sizes, as well as in fine flakes and scales disseminated through any of the various gangue minerals, feldspar, calcite, barite, or quartz. Beautiful fern-like skeleton crystals of native silver are frequently found in certain cavities in these veins from which the enclosing calcite has been removed as a result of weathering. It would be unwise in this connection to give any detailed list of the many mining locations on which native silver has been discovered or to mention what are at present regarded as the more promising individual discoveries. It may be sufficient to say that several veins have been uncovered, varying in width from 4 to 8 inches, much of the material from which would average from 25 to 75 per cent. of native silver, while a large number of other veins have been proved to contain silver in such quantities as to merit further and quite extensive mining development work. The mode of occurrence and association of this silver in some of these veins bears a striking resemblance to that obtaining in the veins cutting the diabase in the vicinity of Kerr Lake near Cobalt. It seems therefore very reasonable to assume that many and possibly wider and richer veins will be revealed as a result of this season's mining operations, when conditions should be much more favorable for prospecting and development work.

"It may be well in this connection to mention and even to emphasize some of the points which should strengthen the opinion that the Montreal River mining district will become in the near future a permanent mining camp.

"1. The wide extent of country over which these mineral veins have already been found.

"2. The large number, width, continuity and well-mineralized character of many of the veins so far located.

"3. The very general presence of native silver in these veins.

"4. The great richness of some of the ore already secured, some of which compares favorably with the best found in the veins of Cobalt. The region is certainly one of great promise, and worthy of the most earnest and intelligent search.



### Geological Association of the Ore Deposits.

"All of these veins occur in diabase or gabbro, a rock which represents the consolidation of a lava of basic composition which has been intruded in the form of laccoliths and dykes through rocks of Huronian, Keewatin and Laurentian ages. The rocks representative of the Huronian are conglomerates, slates, and arkoses or quartzites, very similar in structure and mineralogical composition to rocks of the same geological age found in the neighborhood of Cobalt. No rocks of Keewatin age have been found in James Township, but extensive outcrops occur in the central and eastern portions of Tudhope Township.

"The Keewatin is intruded by certain granites and gneisses which are usually referred to as Laurentian. These two rocks form an igneous complex lying unconformably beneath and furnishing the pebbles and other detrital material of which the basal conglomerates of the Lower Huronian are composed. These gneisses and granites cover large areas in the central and northern portions of the Township of Tudhope, also nearly the whole of the Township of Smyth and the northwest corner of James, and thence west and northwest to Hubert Lake and beyond.

"Smaller patches of granite are also exposed as a result of denudation in the southern part of James Township.

"The diabase or silver-bearing formation is the newest rock in the district, as it is intruded through all the other series, cutting even the arkoses and quartzites which are at the summit of the sedimentaries. The distribution of these several formations is well shown on the map of the Montreal River and Temagami For-

est Reserve lately issued by the Bureau of Mines of Ontario, the necessary geological surveys having been made by Cyril W. Knight and his assistants during the past summer.

"All of the veins of economic importance so far discovered appear to be confined to this diabase, which is essentially similar in mineralogical composition and geological age to that in which some of the most productive silver veins of Cobalt are being mined. Occasional fissures, some of them rather wide and continuous, were noticed in the conglomerate filled with calcite, quartz, and barite, and carrying galena, but the assay values of such material were disappointing. It is, however, reasonable to suppose that productive veins will yet be found, although extensive outcrops of the rock usually shows very little fissuring. Most of the hand specimens of the diabase which were given to Dr. Young for microscopical examination were collected in the vicinity of one or other of the mineral bearing veins and therefore doubtless show more advanced decomposition than would be the case had the material been secured from exposures farther removed from the influence of such eruptive afteractions.

"As a result of our prospecting work in the Township of James, we are now in possession of two mining locations, the S. E.  $\frac{1}{4}$ , North  $\frac{1}{2}$ , Lot 9, Con. V., now known as M. R. 202, and the N. E.  $\frac{1}{4}$ , N.  $\frac{1}{2}$ , Lot 12, Con. 4, known as M. R. 422."

In the next issue of the Canadian Mining Journal Dr. Barlow's reports on the same district and on the Miller Lake areas will be touched upon. Mr. D. B. Dowling's report on the Albertan coalfields examined by him will receive attention.

## BOOK REVIEWS

**A Study of Ore Deposits for the Practical Miner, with Descriptions of Ore Minerals, Rock Minerals, and Rocks. By J. P. Wallace. Illustrated. \$3.00 net prepaid. Hill Publishing Company, 505 Pearl Street, New York.**

The title of this volume may fairly be expanded to something like this: "A Study of Ore Deposits for Miners and Prospectors Who Have Had no Technical Education." Possibly this suggested title best defines the object of Dr. Wallace's new work.

From readers of the Canadian Mining Journal there come constant inquiries as to the best book on the subject of ore deposits. Questions of this kind are peculiarly difficult to answer. There are dozens of good books on ore deposits. Most of these, however, are written from the standpoint of geology. Some of them are so thickly befogged with hypertechanical modern words that they are intelligible only to the specialist. Others of these books cover but single districts or one particular variety of deposits. Possibly these strictures apply with but little force to several of the more popular books that treat of ore deposits. But in general it will be conceded that a book covering the whole field in an elementary way and at the same time free from the fustian of the schools, has long been desired. Dr. Wallace, we believe, has shot near the mark, if not quite into the bull's-eye.

To define the purpose of the book it is best to quote from the author's foreword: "The book is written for

the average miner, the prospector, and the mining public. It is eminently practical, of simple language, concise in treatment, and deals only with essentials. A knowledge of minerals, ores, and rocks is important to a correct understanding of ore deposits, for all are intimately associated. A brief description, therefore, of these is given. The structural features of ore deposits and the walls enclosing them, together with the form, origin, and manner of occurrence of deposits, have been given special attention. . . Descriptions of prominent mines of various type and forms are presented chiefly to exemplify and enforce the principles herein set forth governing the deposition and occurrence of ores."

Ore minerals are taken up in Part I. The physical properties of minerals are outlined succinctly, and then the minerals that constitute the ores and metals are dealt with in groups.

Part II. discusses the rock-forming minerals, rocks, and rock displacements. This section is lucid and comprehensive.

Part III., General Characters and Classes of Ore Deposits, sketches the principles of ore deposition, vein formation, ore bodies in general, etc.

Part IV. is a series of descriptions of ore deposits of many well-known and characteristic mines and workings the world over.

Part V. is a summary of the art and practice of mine valuation and prospecting.

The volume is designed, as has been noted above,



for the benefit of the non-technical reader, whether he be a miner, a prospector, or an investor. Undoubtedly it affords a clear and sufficient introduction to mining geology. Its freedom from technical polysyllables is a virtue.

Here a point may be raised. Both the selection of matter to be included in such a book and the rejection of material considered unsuitable or unnecessary are tasks bristling with difficulties. In one respect we think that Dr. Wallace's volume might have been improved. He has made no mention of chemical symbols and formulae. No doubt the non-technical reader fights shy of anything resembling chemical notation. Long, loose, and complicated equations are intelligible only to the expert. But it is decidedly necessary for any reader to acquire a knowledge at least of the symbols that represent the elements.

This may be taken, not as dispraise, but as alluding to a debatable point.

Finally, both author and publishers deserve large credit in bringing out a book that should and no doubt will form the connecting link between thousands of lay minds and a study of absorbint interest and of immeasurable importance.

**A Manual of Practical Assaying.** By the late H. Van F. Furman, E.M. Revised by William D. Pardoe, A.M. 8vo., 497 pages. Illustrated. Cloth, \$3.00. Sixth edition, revised and enlarged. John Wiley & Sons, New York; Chapman & Hall, Limited, London.

Since its first edition appeared in 1893, Furman's "Assaying" has been a deservedly popular manual both in the class-room and in the laboratory. It is among the best of the many books that attempt to cover completely or partly fire-assaying, gravimetric analysis, and volumetric analysis.

The primary importance of careful sampling, whether the chemist is dealing with ores or with metallurgical products, is recognized, and sixteen pages are taken up with descriptions of sampling methods and devices.

By intelligent preliminary examination of the material submitted, the assayer saves time and labor. Chapter III. recapitulates the principal determination blowpipe tests.

Chapter IV. takes up apparatus and operations. Crushing and other appliances are described in general terms, and the operations of weighing, filtering, etc., are touched upon. The absence of minute details as regards muffle furnaces, balances, etc., is to be commended. The chemist can always secure these in any of the numerous trade catalogues that are to be had for the asking. However, since several diagrams of muffle furnaces are used, it would be an improvement to replace the present cuts with more modern representations.

Chapter V. is a short classified description of re-agents, grouped under the heads of fluxes, solvents, precipitants, reducing re-agents, oxidizing re-agents, and indicators.

Part II., comprising 160 pages, outlines the analytical methods employed in determinations of the principal metallic and non-metallic elements. Special assays and analyses, such as the assay of base bullion and the analysis of gases and of water, form the subjects of this section.

The writing of chemical equations, the calculation of lead blast-furnace charges, and like operations, the preparation of pure gold and silver, the mechanical assay of gold and silver ores, etc., are among the chapter-subjects of Part IV. Useful tables of analytical results and factors are appended.

In this sixth edition the reviser has rewritten the chapters on zinc, water, and coal analyses, and has added chapters on the assay of telluride ores, tungsten, molybdenum, and vanadium.

The discrimination with which the limited space allowed for each topic has been used is evident in many pages. For instance, in the chapter on coal and coke the correction factor for loss of moisture in powdered coal, recommended in the Report of the Committee on Coal Analysis, is noted.

The chapter on copper needs re-writing. The statement that "the cyanide method is generally more accurate and preferable to the battery method" requires serious qualification.

On the whole, Furman's "Practical Assaying" is a book of distinctive merit. It is a book without which the library of the assayer and chemist can hardly be considered complete.

## EXCHANGES.

**The Engineering Magazine, January, 1909.**—Mr. A. Selwyn-Brown continues in this number his study of the principal Australian gold fields. His article, "Metallurgical Practice in the Gold Fields of West Australia," has one particularly interesting section on wet crushing. A table in this section gives details of stamp-mill practice:—

|                           | Golden<br>Ivanhoe. | Horseshoe. | Oroya-<br>Brownhill. | Lakeview<br>Consols |
|---------------------------|--------------------|------------|----------------------|---------------------|
| Number of stamps.....     | 100                | 150        | 50                   | 70                  |
| Monthly tonnage .....     | 19,000             | 23,000     | 11,000               | 11,000              |
| Daily tonnage, per stamp. | 6.35               | 5.50       | 7.35                 | 5.50                |
| Weight of stamp in lbs..  | 1,200              | 1,270      | 1,100                | 1,200               |
| Drop in inches.....       | 7.5                | 8.0        | 7.75                 | 80                  |
| Number of drops per min.  | 104                | 104        | 108                  | 102                 |

About 20 to 40 per cent. of the gold in the ore is saved by battery and plate amalgamation. Some of the mills, the Oroya-Brownhill, for instance, do not use plate amalgamation.

The "continuous" process of cyaniding is used principally. The finely ground ore is kept in contact with cyanide solution throughout the treatment. The battery water in the west-crushing plants carries from 0.003 to 0.007 per cent. potassium cyanide in solution. At a few mills bromide of potassium is added to the charge. Some of the ores treated by bromo-cyaniding yield 95 per cent. of their gold tent. Filter pressing for removing the used solution from the sand and dslime has replaced decantation.

Below water level in most of the fields the ores carry larger percentages of sulphides and concentration is resorted to. The concentrates are roasted, ground, and either amalgamated or cyanided.

**Electro-chemical and Metallurgical Industry, January, 1909.**—In an article comparing the electric furnace with the blast furnace, Mr. J. Harden, having established data that afford a fair basis of comparison, relegates the electric furnace, in its present stage of development, to localities where there are large deposits of



cheap iron ore and abundant water power. He indicates the desirability of keeping "some of those optimists a little nearer to the earth, who dream that the days of the good old blast furnace are doomed, and must give way to the more modern electric smelting."

**The Mexican Mining Journal, January, 1909.**—In summing up the prospects of the Mexican mining industry for the coming year, our contemporary speaks in part as follows: "The continued low price of silver is turning attention to the production of the base metals and to the treatment of the complex ores heretofore disregarded, and the opportunity in this line is enormous in Mexico. . . . The prospects for the Mexican mining industry are bright, for it has as a basis the most extensively mineralized large area in the world, and the business is now largely in competent hands, backed by sufficient capital." Does not the Mexican Mining Journal make too large a claim for the extent of the mineralized area of Mexico? The vast mineralized area of the Rocky Mountains of British Columbia, Alberta, and the Yukon must be taken into consideration in any such assertion.

### CORRESPONDENCE.

To the Editor of the Canadian Mining Journal:

Dear Sir,—I have just read again with a great deal of interest Mr. O. D. Skelton's paper in your issue of November 1st, on the taxation of mineral resources in Canada, and I wish to compliment the scholarly Queen's professor on his bright, clear, and solid resume of such a complicated question, and to express the hope that Mr. Skelton will favor us with other valuable papers on this subject, discussing more in detail its important and controverted phases. Of these I believe there are several that should be thoroughly threshed out, one by one, before the public and before our legislatures. If that were done, I feel that it would conduce to an entirely different public understanding of the whole question. Permit me to suggest below a few of these points:—

1. Are not mineral resources and mineral properties in Canada already bearing their just share of taxation, quite like other resources and properties, without the additional royalty tax imposed upon them, such, for instance, as in Ontario by the Supplementary Revenue Act, 1907?

2. If so, are not the extra special taxes, commonly called mining royalties, not only unfair, but very detrimental to the full growth and development of the vast untouched mineral resources of this great country, and therefore are not such taxes causing great loss and injury to the whole country?

3. If not so, and special taxes should be imposed, cannot a form be given to that tax (such, for instance, as the form of acreage tax) which would make of it an important factor in the great object to be attained, namely, a much fuller development of the mining resources and industry?

4. If a special tax is imposed, in whatever form, should it not bear on all mineral resources and properties alike, proportionately?

5. Should there be reserves, exceptions, and compromises in the selling of mineral lands or in the granting of mineral leases through which certain mineral resources and properties are finally taxed infinitely

more than others, or become Government owned and operated mines?

6. Should mineral lands acquired in fee without reservations before the passing of a Supplementary Revenue Act, or any other Act imposing a special tax or royalty, be subject to these taxes or royalties?

7. Can export taxes be legally and properly imposed by Provincial Governments, such as the tax imposed on exported natural gas by the Ontario Government?

8. Should not the capitalization of mining companies be limited by the imposition of a heavy tax on their capitalization, or by other means?

In another letter, Mr. Editor, I shall answer these questions one by one, openly and frankly, and I hope the others will do likewise.

Nothing would help the solution of these most important problems of mining taxation and mining development so much as a thorough and open discussion in the pages of a technical journal such as yours, recognized as the official organ of the mining community all over the country.

Discussions on this subject in the meetings of the Canadian Mining Institute, or at other meetings, are very good, but they lack the deliberation, maturity, and calmness of written discussions in good technical papers.

Yours very truly,

EUGENE COSTE.

Toronto, Jan. 4th, 1909.

### Burns' Steer.

The Editor, Canadian Mining Journal, Toronto:

Sir,—I heartily sympathize with the M.f.C (Man from Cobalt), who, in the Journal of December 1st, protests against your illustrated account of his awful experience with Burns' steer. It was once my good fortune to have a true and trusted friend who got in about as close quarters with a grizzly as the M.f.C. did with the steer. It certainly took away his nerve, and we tabooed the subject in his presence. In spite of this, "oft in the stilly night" the remembrance of the grizzly mix-up would recur to him. The result was that he took to drink, slighted a widow, and went rapidly on a downward career.

If the steer episode is not dropped the M.f.C. is apt to follow a similar course. You can see that he has read your article very closely, even noting the substitution of the word "led" for let. Of course this point would appeal strongly to him. It would curdle his blood to think of actually leading such an animal out of the corral. That account of the Mexican bull fight which appeared in the newspaper of recent date should be kept from him. If this kind of thing continues he will lose all liking for the luscious steaks such as the Mint formally served.

Steers, when excited, have long been known to be the most dangerous of beasts. Did not Hannibal after crossing the Alps use his oxen to stampede the native inhabitants!

PRO BONO PUBLICO.

To the Editor Canadian Mining Journal:

Dear Sir,—In your issue of December 1st you state the desirability of the public receiving a "clear pronouncement" from some of us in the matter of the present boom in Cobalt transactions. By the light of my own experience I do not think the public is easily



reached in this matter through the publi presse One cannot expect a newspaper to condemn its own advertisements. In fact, I believe advertisers expect some protection in this matter.

Thus we are cut off from a contact with the participators of the boom, since mining journals are not much consulted by the speculative public. At a meeting of the Canadian Mining Institute at Toronto in March, 1907, when Cobalt was also much to the front, we were addressed by Sir Mortimer Clark. His speech was one of wise warning against the speculative condition of the mining market. It was very much apropos of the situation, and a following speaker said it ought to be published in every paper in Toronto next morning. It appeared in none of them.

Even if we could place a sane and honest statement before the speculative public it would be useless: the very people whom we seek to dissuade would turn on us for depressing the market inflation by which they hope to profit.

Why should the trainers of "future mining engineers" lecture to mining gamblers. Boom speculation is a curse to the mining industry, but it cannot be reached by academic admonition.

Please make a note of it that the present undesirable condition of Cobalt propositions is not due to "young graduates from mining schools."

We are often treated to stories of their inexperience and unfitness for mining undertakings, but these, it seems to me, are small evils compared with misrepresentation and amongst this misrepresentation mining school graduates are not likely to be found. Yours truly,

J. C. GWILLIM.

#### "MINERAL VEINS IN THE MONTREAL RIVER DISTRICT."

Under this title, in the last issue of the Canadian Mining Journal (December 15th, 1908), Mr. J. B. Tyrrell devotes much of his attention to discussion and, at times, adverse criticism, of some of the main statements included in my "Summary of Conclusions," which appeared at the end of the paper, "On the Origin of the Silver of James Township," read before the Canadian Mining Institute at its last annual meeting (Ottawa, March, 1908).<sup>1</sup>

I can only express regret that in Mr. Tyrrell's opinion this paper as "rather too technical in character and diction to be thoroughly enlightening to the ordinary prospector or miner," for my whole endeavor in its preparation was to avoid as far as possible all unnecessary technical expressions or descriptions. Previous to the appearance of Mr. Tyrrell's observation I had regarded my efforts in this direction as fairly successful, especially as many prospectors and miners had remarked that it was an unusually simple treatment for so technical a subject. At the same time I may be permitted to mention that I was not addressing the "ordinary prospector or miner," but an Institute, which is every year adding to its membership men of the highest technical training and experience.

In regard to the form assumed by the diabase with which the mineral veins are associated, I can only refer Mr. Tyrrell to my statement that it "has been intruded in the form of sills or laccoliths and dykes through rocks of Huronian, Keewatin, and Laurentian ages."<sup>2</sup>

I never made use of the term "batholithic" as descriptive of the mode of occurrence of this diabase, as would appear from the report of the discussion, which unfortunately was not revised by me. I can only repeat, therefore, and would make especial emphasis of the fact, that the diabase or gabbro represents the solidification on cooling of a lava which has been intruded through the neighboring rocks in the forms of sills, laccoliths, and dikes. I have never "forgotten this at times," nor has there been any "uncertainty in my mind on the point." I do not feel obliged to apologize for the use of the term "profound" in describing the fissuring to which the diabase has been subjected, but would explain that it was employed as a synonym for "widespread" or "extensive," expressive of my belief, not only of the persistency to very considerable depths of many of these veins, but also of their proved unbroken continuity over surprisingly long distances in a horizontal direction.

In this connection it may be well to state that in the present state of our knowledge it is difficult to make any very definite statement in regard to the exact thickness of these laccoliths at the various localities where they are exposed; for in nearly every instance a considerable part of the upper portion has been removed by erosion. In addition it is quite conceivable that such intrusive masses should show a considerable variation in thickness from point to point. From a rather critical examination of a large number of these occurrences, however, it may be stated that many of these intrusions must have originally been from 300 to 500 feet thick.

Mr. Tyrrell further says that "it is rather unfortunate that more exact descriptions of these veins are not given," and then proceeds to mention a rather unusual occurrence as illustrative of what he believes to be their prevailing complexity. It is to be deplored that Mr. Tyrrell has not taken advantage of this opportunity to add further to our information in this regard rather than indulge in vain regrets, for the descriptions of these veins already published in the paper mentioned are regarded by the author as fairly complete and representative of the majority of the occurrences that came under his notice.

In all magmas produced from natural causes, water is believed to be present in very considerable amount, so that as crystallization and solidification advances the residual magma or "mother liquor" (menstruum) approaches more nearly to the composition of a mass of fused feldspar together with a comparatively large amount of water. It is at this somewhat indefinite stage in the cooling of the diabase that the pegmatite (aplite) began to form. Mr. Tyrrell's description of "pegmatite" as an "aqueous" rock is however not only unusual, but not strictly scientific, in spite of the fact that water has played an important role in its formation; for extreme cases, in which vein action is most pronounced, are now regarded as the products of igneous aqueous solution.

I find myself in substantial agreement with Mr. Tyrrell "that the fissures in which the silver-bearing veins occur have been formed by the shrinking of the quartz-diabase or adjoining rock as it cooled or solidified," but can hardly follow him when he states that "in some cases they (the fissures) extended to the still molten interior or lower portion of the mass of the quartz-diabase and allowed this liquid rock to rise up through them and form narrow dykes. Surely Mr. Tyrrell cannot mean to describe these dikes or veins

<sup>1</sup>Jour. Can. Min. Int., Vol. XI., 1908, pp. 256-273.

<sup>2</sup>Loc. cit. p. 267.



as made up of quartz-diabase, for the so-called "aplite" of the miners and prospectors differs very essentially from its parent rock both in mineralogical composition and structure.

He further states, "Thus the dikes were formed after the surrounding diabase had solidified but while it was still very hot." This, in my opinion, is only a portion of the truth; for while many of these veins or dikes are abruptly differentiated from the associated diabase, exhibiting perfectly sharp and, in some cases, "free" walls, others show a gradual transition from the vein material (pegmatite) into the surrounding diabase, which gradation can only be explained on the assumption of a commingling of material while both were in a fluid or, at most, a viscid condition and before complete solidification had taken place.

Not only the native silver, but also the characteristic sulphides and arsenides began to be introduced along with the first pegmatite (aplite) filling. These metallics did not wait for the reopening of the pegmatite and the introduction of more abundant calcite, for this latter mineral accompanied and overlapped the crystallization of the feldspar.

It is perfectly legitimate to speak of the more feldspathic types of these occurrences as either "dikes" or "veins," for the feldspar is just as much secondary and the gangue of the metallic minerals as even the calcite or quartz. The pegmatites not only "have a distinct significance in defining the positions of the most important fissures," but they are themselves the "ore bringers."

The use of the terms "dike" and "vein" as separate names in regard to pegmatite is misleading. The strict limitation of their meaning has led to certain misconceptions as to its manner of formation. I would prefer to make the two terms synonymous, or, better still, to use "vein" in both senses, for, accurately speaking, every "mineral vein" is intrusive into the surrounding country rock.

ALFRED E. BARLOW.

Montreal, Dec. 26th, 1908.

(NOTE.—Mr. Tyrrell's manuscript reads "igneous" but by some inadvertence, "aqueous" was substituted for it in the printed article.—Ed.)

## INDUSTRIAL NOTES.

**Air Compressors.** Catalogue No. 100 of the Thos. H. Dallett Co., Philadelphia.—Of massive construction and up-to-date design, the compressors made by this company are built to secure high efficiency. The present catalogue illustrates only the standard belt- and steam-driven compressors. The company designs and builds machines direct connected to motor, water-wheels, or gas engines. The frame of these machines is rigid, massive, graceful, and designed so as to place ample support under the main bearings. The air cylinders are made of a special, hard, close-grained iron. All steam cylinders are lagged with mineral wool and jacketed with planished sheet steel. Other features, too numerous to mention, mark the Dallett compressors as durable and serviceable machines.

**Circular No. 1118, December, 1908,** issued by the Canadian Westinghouse Company, Limited, Hamilton,

Ontario, is devoted to that company's Type CCL Polyphase Induction Motors. Like all of the Westinghouse publications, the pamphlet before us is excellent in make-up and matter. The variety of electric motors available now is enormous. This circular presents, succinctly and clearly, an accurate idea of the merits of Westinghouse polyphase induction motors of the squirrel cage type. A particularly commendable and important feature of these motors is their absolute freedom from sparking. It is claimed for them that they can be used with entire safety in places surrounded by inflammable or explosive material.

**Catalogue 67 D. The Jeffrey Manufacturing Company Columbus, Ohio. "Jeffrey Rubber Belt Conveying Machinery."**—The science and practice of conveying ores, fuels, and other materials by means of rubber belts have made enormous strides in the last decade. The Jeffrey conveyors represent probably the last word of progress in this direction. Catalogue 67 D. illustrates belt conveyors for all sorts of materials—coal, gold ore, stone, slimes, asbestos ore, mill refuse, etc., etc. On page 3 a short list of order specifications is given. Mine operators should secure copies of this catalogue. It is profitable.

## PERSONAL.

Mr. Alex. Gray, of Montreal, was in Toronto on Jan. 7th.

Mr. Chas. Fergie has taken temporary headquarters at the Windsor Hotel, Montreal.

A postponed meeting of the council of the Canadian Mining Institute was held in Toronto on Saturday, January 9th.

Mr. Broadbent, collector for the National Mineral Museum, has been detailed by the Geological Survey of Canada to collect British Columbian minerals for the Seattle Exposition next spring.

Mr. W. A. Carlyle, of London, England, at present consulting engineer to the Le Roi Mining Company, Rossland, B.C., has been offered the professorship of Metallurgy in the Royal School of Mines.

The annual meeting of the Mining Society of Nova Scotia will be held on March 3, 1909, at the rooms of the Society, 129 Hollis Street, Halifax, N.S. The annual dinner will be held during the session. Delegations from Ontario, Quebec and the United States are expected.

Tantalum is one of the world's rare materials that has been suddenly produced in commercial quantity in response to a demand for it. The name is said to have been given by Ekeberg, the Swedish discoverer, on account of tantalizing difficulties encountered in investigating it, and only recently has it been obtained in a state of purity. The mineral yielding it was a few years ago so hard to find that museums could not be supplied with specimens. Australia alone now furnishes more than 70 tons of tantalite a year—not a large supply, but enough for present needs, as a single pound of tantulum gives filaments for 25,000 lamps of 25 candle-power.



## SPECIAL CORRESPONDENCE

## NOVA SCOTIA.

**Glace Bay, Jan. 4.—Naked Lights vs. Safety Lamps.**—The verdicts of coroners' juries are things to be wondered at. The jury which sat on the victims of the recent Marianna explosion in the United States was referred to by the Engineering and Mining Journal as being composed of farmers, and described as "more than usually fatuous." Under the above caption we referred in the last issue of the Journal to the verdict on the men who were killed at Port Hood about a year ago. We now have to refer to the verdict which was given by a jury that sat at Chignecto Mines on Christmas Eve, 1908, which read as follows: "John H. Coleman and George Sawyer came to their death by suffocation in the mines of the Maritime Coal, Railway & Power Company, Joggins, on the 24th of December, 1908. We recommend that in future asbestos or other material be used by the company for bratticing when anyone has to pass with open lights." For pure unadulterated fatuity we think the Nova Scotian verdict will be hard to beat. The accident was caused by the ignition of bratticing by the lights carried by the men. In the last correspondence written in November we remarked as follows: "The foolishness of naked lights in coal mines, to our mind, needs no emphasis. A coal mine is a place where inflammable material is dug out, and the surroundings of men who work underground are such things as coal, wood, an inflammable dust capable of detonation, explosive gases, brattice cloth, and tub grease." In a recent official report to the British Home Office the statement is made that so long as open lights are used explosions, and mine fires may be expected to occur with more or less regularity, and that the law in its present state is inadequate to forbid their use. Fortunately, our Nova Scotian law is adequate in this respect, and it may be that instead of ordering asbestos brattice cloth, the powers that be will remove the naked lights. It would seem the simpler thing to do. Seriously speaking, the incident just referred to is only one of the constantly recurring reminders that naked lights in mines belong to the days of furnace ventilators, black powder and home-made squibs. That we should still be using naked lights in coal mines so many years after Davy is a reflection on our intelligence. We think it will be well within the mark to state that not a single mine explosion or mine fire would have ever taken place in Nova Scotia had the use of safety lamps been compulsory and the use of naked lights prohibited. That this attitude is not a peculiar one is evidenced by an article that recently appeared in the Maritime Mining Record, written by Mr. C. J. Coll, of the Acadia Coal Company. No one will question Mr. Coll's knowledge of his subject or his ability to pronounce on any matters connected with Nova Scotian mining. We are therefore glad to see that his condemnation of naked lights in coal mines is unqualified, and once more venture to repeat "that naked lights should be forbidden, and nothing but properly approved and tested types of safety lamps be used in every coal mine in the Dominion." Some responsible persons who should know better have recently expressed the opinion that mine explosions are "mysteries" and "acts of God." As was very properly pointed out by a conference of mine inspectors in the United States recently, such opinions merit the strongest condemnation, and are, moreover, hypocritical cant of the worst kind. Most mine explosions occur because "somebody blundered." The most stupid and inexcusable blunder is to continue the use of naked lights, and it is high time that governments should awake to a sense of their responsibility and make it impossible for anyone to make this blunder in the future—and keep out of prison.

**A "Wildcat" in the Maritime Provinces.**—Ontario is not the only land that breeds the wildcat. One of the woolliest of his tribe is now to be found in Nova Scotia. Dr. Hugo von

Hagen, from New York City, is a wizard of finance of no mean order. He bought a property of some 7,000 odd acres at Adamsville, New Brunswick, for \$5,000, and floated a company to operate the seams of coal that are supposed to be in it, with a capital of \$3,500,000, and although no coal has as yet been mined, and so far as we can learn only three men are working on the property, the company is paying a monthly dividend! This same gentleman is carrying on a similar affair at Maccan, in Nova Scotia. It would not be amiss if the Attorney-Generals of the two provinces that have been favored by Mr. von Hagen's projects were to make a few inquiries into these truly remarkable mining companies. Mr. von Hagen in a circular to his shareholders states that he has obtained a contract to supply the German navy with coal—from New Brunswick, too!—and has also elased a contract for 500,000 tons with a large English coal broker. The German navy will cease to be the bugbear that it now is to our folks at home if it depends on Von Hagen's mines for fuel. Is it not about time that someone stopped the little game of this visitor from New York—the East Side, we presume?

**The British Workmen's Compensation Act.**—It was predicted that the operation of the Workmen's Compensation Act in England would eventually kill the provident societies that have been so great a help to the working classes in helping them in thrift and in providing for them in sickness. That that prediction was not without grounds is being daily proved by the reports of the friendly societies. One of the most important of these societies in England is the Independent Order of Druids, which has 71,000 members, nearly all drawn from the artisan and working classes. At the half-yearly meeting of this society held in Sheffield during November, some serious facts were ventilated. One of the delegates said the Compensation Act had a lot to answer for. "It made some of their members what they never should have been. When a man was drawning his compensation, his club money, and sick pay, he was unfortunately very loath to start work again." Owing almost entirely to the increase in claims caused by the malingering which the Compensation Act is fostering, the claims upon the funds of the society showed an increase over the corresponding half year of over \$55,000. We quote from the report: "Not only has the whole of the members' contributions been absorbed this half year, but in addition no less a sum that £2,221 13s 7d has been taken out of the money realized on our investments to pay the liabilities of the half year ending June 30th, 1908." It was admitted that the miners, because of the workings of the Compensation Act, were unprofitable members of the order, and a proposal to exclude them from membership received large support, but was not carried. A motion to reduce sick pay by one-third to members in receipt of compensation from employers was carried by 30,000 votes to 24,000. This meeting is typical of the half-yearly meetings of all these provident societies. All their reports tell the same story. For many years these self-sustained associations of workmen for mutual help have been the pride and the mainstay of the better type of worker, but their gradual extinction is now assured. As the delegate we have quoted says, the "Compensation Act has a lot to answer for." And the end is not yet. The accumulating burden of this piece of legislation is only beginning to roll up. The Old Age Pension scheme in England is the necessary corollary of the Compensation Act, and it is to be followed by the Eight Hour Act for mines. Is it any wonder that we hear of unemployed and thriftless working classes in England, or that English capital looks abroad for investments? In all these recent enactments all volition and all onus is taken from the worker and placed on the shoulders of the capitalist and the state. So far,



the result is not enlivening. The House of Lords threw out the Licensing Bill, which proposed to limit the sale of liquor, but they passed the Eight Hour Act, thereby endorsing the cry of "less work and more booze," which finds favor with an ever-increasing number.

#### ONTARIO.

**Cobalt.**—The year 1908 has been a period of hard work, construction, development and largely increased production for Cobalt. When all returns have been secured it will be seen that the value of the year's shipmentss, notwithstanding the decreased price of silver, will be 50 per cent. greater than for 1907. There are now 30 shipping mines. Ten of these have been added to the list during the present year.

In point of tonnage La Rose stands first with 4,797.73 tons to its credit. Next comes Ippissing with 3,474.50 tons; then O'Brien, 3,439.08 tons. The McKinley-Darragh, Trethewey, and Drummond were next in tonnage.

It is obvious, however, that many mines with small shipment records, the Coniagas, Crown, Reserve, Kerr Kake, and others made up in quality what they lacked in quantity.

The fact that the stock boom has switched past Cobalt and has taken its way up the Montreal River is a matter that pleases all resonsible operators. No boom is wished for here. It is not needed. Booms are too expensive. We have had our share.

September was the banner month. Its record of 3,049.14 tons beats all monthly figures up to date.

The rich finds on Crown Reserve and Temiscaming were the outstanding features of the year's operations. Along with these these may also be mentioned the excellent showing made by the Trethewey under the management of Suprintendent McNaughton.

Most of the old shippers preserved and improved their rank during the twelvemonth. There were, however, one or two casualties. Red Rock and Green-Meehan disappeared, and Foster dropped far behind.

Two custom concentrators are in operation and both are doing good work. The Northern Custom Concentrator has a capacity of 100 tons per day. The Nipissing Reduction Company is rated at 50 tons per day. Both these plants are milling the dumps and are effecting a good saving.

The Coniagas mill is working in better shape than ever before. The addition of twenty stamps has made a decided change in the practice obtaining here. The Cobalt Central mill is in continuous operation. Good reports come from the Buffalo mill. The new O'Brien mill will be completed before spring. It will embody many new features.

In the life of the camp the Canadian Mining Institute has become a decidedly interesting factor. The periodical meetings are looked forward to with eagerness. The discussion all always profitable and sometimes white hot. They afford a useful vent for the airing of opinions and the setting of differences. Mr. A. A. Cole, Mr. E. L. Fralick, and Mr. H. P. Davis have been among the most active in promoting the movement and adding to the membership of the Institute.

The unusual number of accidents that have been recorded during 1908 impresses one with the need of more rigid enforcement of the law. Inspector Corkill has recently closed down several mines for non-compliance with regulations. It is decidedly up to the superintendents to see that unnecessary risks are not taken. The employment of green men in positions of rsponsibility is one of the chief causes of disaster. A few convictions and good hard sentences would clear the atmosphere.

The Larder Lake country has not been attracting much attention lately, although a pocket of very rich ore was found on

the Harris-Maxwell property early in the summer. Mr. Neil Macdonald has been conducting a mill test on the ore of that property, but with what result is not yet known.

From the table of returns [see Statistics and Returns] it will be seen that the silver production is almost 18,500,000 ounces. It will also be noticed that the greatest bulk of the high grade ore went to Copper Cliff, Deloro, the Balbach Company, and Perth Amboy. Thorold took 180 tons. This year, of course, Thorold will receive a much larger proportion. Denver took over 60 per cent. of the low grade ore.

Cobalt enters upon the new year with every confidence in her ability to increase her earning power, decrease her costs, and generally show the world at large that she is here to stay.

#### BRITISH COLUMBIA.

**Grand Forks.**—(Abstract of letter from Manager A. B. W. Hodges, of the Granby Consolidated Mining, Smelting & Power Co.)—At the mines there has been no specially large construction undertaken during the last year. All our new work—that is, the completion of the Victoria shaft and the crushing and conveying apparatus at the Curlew, was all finished, I think, before 1908, and since then we have done nothing special in construction, except ordinary development work and diamond drilling, and have maintained an output of over one million tons during the year.

At the smelter the total ore treated was 1,037,089 tons, producing 23,535,009 lbs. of copper, which is the largest year's production.

We have spent a great deal of money in new construction at the smelter, and the following new work has been done during the year: New ore and coke storage bunkers 1,000 feet long, each, have been installed, holding about 7,000 tons of ore and 4,000 tons of coke.

We intend enlarging our 8 blast furnaces from their present length of 18 feet to 22 feet by 33 inches wide, and one of these is already enlarged and in operation. We have also added two Connersville rotary blowers of 30,000 cubic feet per minute capacity each. These are operated as before by two 150 h.p. motors each. We have also built a new steel dust chamber at the back of the furnaces to replace the old brick one which was torn down. Have also enlarged the brick part of the flue from the steel flue dust chamber to the brick stack. Our blowing engine-room, which was of wood, has been completely torn away and a new thoroughly fireproof building has been installed in its place. The building is of steel and brick, with cement floors. This was made large enough to accommodate the two new blowers and also the new blowing engine.

The converter department has been materially enlarged by adding 80 feet in length to the main building, also enlarging the lining machinery, and we will also install three large converters 7 feet by 10½ feet. These will replace two of the old ones which we have in operation, and when the plant is complete we will have three large converters operated by electricity and one small one, which will give us a capacity of 36,000,000 lbs. a year.

We also installed a two-cylinder 40x40x42 electrically operated blowing engine, manufactured by the Nordberg Mfg. Co., of the latest style and type, of 10,000 cubic feet capacity per minute at 12 lbs. pressure.

At present we have a smelting caacity of about 3,000 tons a day, when all our furnaces are enlarged—about June next—we will have a smelting capacity of about 4,000 tons a day with the eight furnaces.

There are many improvements, such as water pipes, change of electric plant, etc., etc., which I have not mentioned in detail, but which had to be done to accommodate the increased capacity.



## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Glace Bay, N.S., Dec. 30.**—It is reported on good authority that the North Atlantic Collieries Company at Port Morien and the company owning the Broughton areas will shortly join forces, and also that the coal lands owned by Manager Cowans, of Springhill, near Morien, will be taken over by the combined company. Manager Richardson, of the first-named organization, is at present in England, and it is expected that the deal will go through within the next six weeks.

**New Glasgow.**—The Nova Scotia Steel & Coal Company, Limited, during 1908 were able to make on their output tally sheet larger figures than ever hitherto shown for coal, ore, and some other of their operations. Where decreases had to be chalked up, they were so small as to be practically negligible. The generally quieter atmosphere of the past year was taken advantage of to prepare by improvements and extensions for the increased business which the company confidently expected 1909 and the following years to bring.

The coal resources of the Scotia Company, on the north side of Sydney Harbor exceed two hundred million tons, with five collieries completely equipped, the combined output of which during the coming year will be easily over 4,000 tons per day, which quantity they hope to be able to market, and, barring accident, will do so, if the transportation and manufacturing machinery of the Dominion is given full employment during 1909, which the vastly improved financial condition and constant growing needs of the country warrant us in assuming will be the case.

The business done during 1908 is partially shown by the following figures:—

|                                                                      | Tons.   |
|----------------------------------------------------------------------|---------|
| Coal mined and shipped exceeded.....                                 | 725,000 |
| Broke made .....                                                     | 90,000  |
| Iron ore mined.....                                                  | 360,000 |
| Limestone and dolomite quarried .....                                | 51,000  |
| Pig iron made.....                                                   | 55,000  |
| Steel ingots .....                                                   | 52,000  |
| Steel billets rolled at mills, New Glasgow .....                     | 53,000  |
| Steel bars, sheets, and forgings manufactured from New Glasgow ..... | 45,600  |

The slowing down from the high pressure of the previous year, carried with it opportunities which were taken advantage of to carry out some schemes of replacement and further betterment in connection with the New Glasgow plant, as well as at at Sydney Mines.

At Wabana the driving of the pair of slopes or tunnels to the submarine ore areas of the company was prosecuted most

vigorously and most successfully, and a few weeks ago these slopes passed through the boundary of the intervening ground between the land areas and the submarine areas of the company, and opened up one the latter a seam of ore equal in quality and purity greater in height than that worked on the surface. The submarine territory thus opened up, and from which we can immediately obtain considerable supplies of ore, is of very great extent, and the one seam alone on which we are now driving may be safely estimated to contain five hundred million tons of ore equal to the best Wabana has ever produced.

### BRITISH COLUMBIA.

**Quesnelle Forks, Dec. 24.**—The property, which has been successfully worked in a small way for several years, has now been bonded to Messrs. L. D. Taylor and A. C. Hirschfeld, of this city, for three years. Word has arrived from F. P. Miller, superintendent of the mine, that indications show that a good clean-up may be anticipated next season. Already a gang of men is at work building a retaining dam, and about ten more lengths of sluices will be added to those at present in place. With a plentiful supply of water now assured by the dam, the season's work will be considerably lengthened and the output increased.

### SASKATCHEWAN.

**Punnichy, Sask., Jan. 6.**—Coal has been discovered in the Touchwood Hills, within five miles of the Grand Trunk Pacific. For the past three years, in fact ever since the Grand Trunk Pacific commenced grading through the Touchwood Hills, several men have interested themselves in the coal deposits in that region. As a result of their investigations, a company has been formed in Montreal, called the Saskatchewan Coal Land Prospecting & Developing Syndicate. Harry Wilson, of Montreal, is the syndicate's engineer.

The main vein is supposed to run through the Gordon Indian reserve. The Indians have surrendered all lands on which coal may be found to the Dominion Government, which has in turn leased the mining rights to the company. The samples show a good quality of lignite. The deposits extend northwest to the Grand Trunk Pacific between Touchwood and Punnichy stations.

### ALBERTA.

**Lethbridge, Alta., Dec. 24.**—The first car of coal was shipped from the Royal mines over the new spur recently completed. It was billed to Regina. All shipments will now be made over this spur.

## MINING NEWS OF THE WORLD.

### GREAT BRITAIN.

Arrangements are being made by the coal owners of Fifeshire and Clackmannan, Scotland, for the erection of a rescue station at Cowdenbeath. A team of men will be trained for rescue work at each of the pits.

The Institution of Gas Engineers has decided to endow a professorship of fuel and gas engineering at Leeds University as a memorial to the late Sir George Livesey.

### NORWAY.

The Evje nickel mines situated in the valley of Sotersdalen, which in 1907 produced 5,781 tons of nickel ore, have been sold to a company represented by Admiral Borresen and Director Sn. Eyde.

### RUSSIA.

The Government has drafted a law for the progressive taxation of government land allotted to mines, with the object of preventing more land being taken up than can be profitably worked. A previous enactment framed with the same view was much more drastic, but its operation was suspended.

### GERMANY.

As a result of the diamond discoveries in German Southwest Africa, the Colonial Office has instructed the Governor of the colony to impose an import duty of 10 marks per carat on diamonds. Negotiations are on foot for the organization of a German prospecting company to form the centre of the German African diamond trade.

**AUSTRO-HUNGARY.**

A terrible explosion of fire-damp occurred on December 16th in the Doman coal mines, near Resicza, Hungary. The bodies of 13 miners have been recovered.

A Swiss firm of boring contractors is prospecting for petroleum in Szemelye Bartia, Saros County, Hungary, on territory that has been favorably reported on by geologists. Oil indications have been found at a depth of 430 metres.

**AUSTRALASIA.**

According to the annual report of the New Zealand Minister of Mines, the production of coal during 1907 was the highest yet attained. It amounted to 1,831,009 tons, exceeding the production of the previous year by 101,473 tons. Operations at the state collieries continue to be extended to meet increasing demands. The manufacture of briquets from the waste slack from the Seddonville state coal mine was commenced in 1907, producing fuel of a high quality, which is largely used on the government railways.

An Iron Bonus Bill has been passed by the Australian House of Representatives, and is now before the Senate and likely to become law. It provides for the payment of a bonus of 12s per ton on pig iron made from Australian ore, and puddled bar iron and steel made from Australian pig iron, and a bonus of 10 per cent. ad valorem on galvanized iron wire netting, wire, and small iron and steel tubes and pipes.

**UNITED STATES.**

Public rescue stations are to be established in the coal mining centres by the U. S. Geological Survey. They will be equipped with the latest life-saving apparatus, and be in charge of government engineers. The parent station at Pittsburg will take charge of the West Virginia and Pennsylvania districts.

The Mikado of Japan has purchased for \$100,000 the largest antimony mine in America, situated in Alaska, in order to obtain material for smokeless powder and metals for making steel ships proof against barnacles.

The iron ore production of the Lake Superior region for

1908 approximated 26,000,000 tons, as against 42,165,000 tons for the preceding year. Of the total shipments 18,000,000 tons came from the two Minnesota ranges.

There has been a remarkable increase in the use of electric power for hoisting and pumping purposes in the Butte, Montana, mining district, which has much improved ventilation, especially in the deeper mines. In several instances the substitution of electricity for steam has reduced the temperature in the mines as much as 20 degrees.

**MEXICO.**

Silver mines all over Mexico are closing down owing to the low price of the metal, as only the highest grade mines can operate to a profit at the present cost of production. Owing to the closing of silver mines, the Oaxaco mining district is attracting much attention, as the values of the ore are largely in gold. Several recent strikes are bringing this district into prominence.

A deposit of sulphur has been discovered within 50 miles from Matamoras, in Tamaulipas. It is from 25 to 30 feet thick, overlaid by about 6 feet of soil and high in sulphur contents.

**SOUTH AFRICA.**

An amalgamation plan is under consideration embracing the Crown Reef, Robinson Central Deep, Crown Deep, South Rand, Langlaagte Deep, and Paarl Central companies. The merger when completed will render the new company the largest gold-producer in South Africa.

Oil fields are reported in the Zwartkops valley, where the geological conditions are analogous to those of the oil fields of Boryslan, in Galicia.

There is an increasing demand for cheap labor on the Rand. The number of Chinese has been decreased by 19,163 since January last year, and although this loss has been met by an increase of 21,078 in the number of natives employed, many more are required owing to the expansion of the mining industry. The mine owners are endeavoring to procure natives from Cape Colony, Natal, and Zululand.

## COMPANY NOTES.

The directors of the Cobalt Central Mines Company have declared a quarterly dividend of 2 per cent. on the capital stock issue of the company, payable February 1st, 1909, to stockholders of record at 3 o'clock in the afternoon of January 15th, 1909.

The annual meeting of the Crown Reserve Mining Company will be held in the hall of the Sailors' Institute Building, No. 2 Place Royale, Montreal, on Wednesday, January 13th, 1909, at 11 o'clock a.m. The secretary has sent out proxies naming John Carson, W. I. Geer, J. G. Ross and J. T. R. Laurendeau for the powers of substitution to vote.

The British Canadian Asbestos Company, Limited, has declared an initial dividend of 1½ per cent. for the quarter, to be paid January 27th, to stockholders of record January 20th, 1909. This places the stock on a 6 per cent. dividend basis.

Bonds of this company to the amount of \$700,000 have recently been placed in London through H. H. Melville, of New York and Boston, assisted by McCuaig Bros. & Co.

The company has a capital of \$1,000,000, and an authorized issue of \$1,500,000 of 5 per cent. bonds, of which \$1,000,000 have been issued. The directors are the Hon. Robert Mackay, E. B. Greenshields, Wm. MacMaster of Montreal, Henry M. Whitney of Boston, Harry A. Berwind and Howard E. Mitchell of Philadelphia. The company owns 879 acres of land located at Black Lake, in the Province of Quebec.

Earnings of the company have been of a satisfactory character, and it is estimated that the earnings for the year will be equal to 12 per cent. on the capital stock.

At a meeting of Le Roi Rossland Mining Company the chairman stated that the profits for October and November amounted to £14,000. The policy being pursued was approved of by the shareholders, as the directors held in their favor proxies representing more than half of the capital. As to prospects of paying dividends, they said they were bound to go on developing for some time. The report was adopted.

The directors of the British Columbia Copper Company intend to resume the payment of dividends early during the coming year. The company declared its initial quarterly dividend of 25 cents per share and an extra disbursement of 15 cents a share, or a total of 40 cents a share on July 18th, 1907. The directors are in favor of paying 2 per cent. bi-monthly or 12 per cent. a year.

A dividend of 2 per cent. on the preferred shares of this company for the quarter ending December 31st, 1908, has been declared, payable on January 15th, 1909, to shareholders of record of December 31st, 1908. The transfer books for preferred shares will be closed from the 1st to the 5th of January, both days inclusive.



Kerr Lake declared a dividend of 4 per cent, or 20 cents a share, payable March 15th. Books close March 1, and re-open March 15th. In November a dividend of 3 per cent. was declared.

Gross earnings of the Dominion Iron & Steel Company for the twelve months of 1908 are shown in the following table:—

|            |              |
|------------|--------------|
| 1905 ..... | \$460,845 54 |
| 1906 ..... | 1,406,305 78 |
| 1907 ..... | 2,247,536 45 |
| 1908 ..... | 2,613,815 66 |

Operations of the Dominion Iron & Steel Company during 1908 follow:—

Production—Ore mined, 556,000 tons; stone quarried, 304,000 tons; coal consumed, 840,000 tons; pig iron made, 263,000 tons; steel made, 279,000 tons; rails made, 153,500 tons; wire rods made, 41,500 tons; other steel products, 35,000 tons; sulphate ammonia, 3,000 tons; tar, gallons, 4,000,000.

Shipments—Pig iron, 18,000 tons; steel blooms, 32,500 tons; wire rods, 44,500 tons; steel rails, 50,000 tons; sulphate ammonia, 2,600 tons; granulated slag, 18,000 tons. Total, 265,600 tons. Tar, gallons, 4,500,000.

## STATISTICS AND RETURNS.

### DOMINION COAL COMPANY, LIMITED—OUTPUT 1908.

No. 1, 531,490 tons; No. 2, 697,860; No. 3, 341,059; No. 4, 418,839; No. 5, 641,794; No. 6, 220,120; No. 7, 126,580; No. 8, 196,082; No. 9, 345,665. Total, 3,519,489 tons.

Shipments from the collieries of the Cumberland Railway & Coal Company, Springhill, N.S., for the month of December, 1908; were 29,808 tons.

### THE CROW'S NEST PASS COAL CO.'S OUTPUT, 1908.

|                   | Coal.<br>tons.   | Coke.<br>tons. |
|-------------------|------------------|----------------|
| January .....     | 93,364.14        | 23,787.14      |
| February .....    | 89,609.07        | 19,897.07      |
| March .....       | 81,708.05        | 21,713.16      |
| April .....       | 70,444.00        | 19,022.15      |
| May .....         | 64,701.16        | 16,110.15      |
| June .....        | 96,212.16        | 26,407.00      |
| July .....        | 99,138.07        | 31,742.00      |
| August .....      | 70,366.18        | 17,646.18      |
| September .....   | 76,610.01        | 22,778.11      |
| October .....     | 84,774.08        | 24,255.00      |
| November .....    | 78,976.05        | 21,582.09      |
| December .....    | 78,323.00 (Est.) | 25,000.00      |
| Total .....       | 986,229.12       | 269,944.05     |
| Total, 1907 ..... | 981,939.00       | 231,368.00     |

Gold output at the Transvaal mines last month, as estimated by Kaffir houses in London, was 635,000 ounces, another high record. If this estimate is correct, December outturn of gold was 13,000 ounces greater than that of October, the previous record. Comparison of value of the month's output is:—

|                                 |                                 |
|---------------------------------|---------------------------------|
| December, 1908.....\$13,495,000 | December, 1907.....\$12,393,000 |
| November, 1908.... 13,048,000   | December, 1906.... 11,685,000   |
| October, 1908..... 13,120,000   | December, 1905.... 9,166,000    |
| September, 1908.... 12,481,000  | December, 1904.... 7,694,000    |
| August, 1908..... 12,484,000    | December, 1903.... 6,075,000    |

The record of silver prices in New York is as follows:—

| Year.      | High. | Low. |
|------------|-------|------|
| 1908 ..... | 58¾   | 47¾  |
| 1907 ..... | 70¼   | 53¾  |
| 1906 ..... | 71¾   | 62¾  |
| 1905 ..... | 65½   | 55   |
| 1904 ..... | 62    | 63¾  |
| 1903 ..... | 61¾   | 47   |
| 1902 ..... | 56½   | 47   |
| 1901 ..... | 64    | 64¼  |
| 1900 ..... | 65½   | 58¾  |

The silver production of Mexico for the fiscal year, 1907-08, as 2,153,014 kilograms, valued at 85,466,904 pesos. Of gold Mexico produced 28,572 kilograms, valued at 38,096,661 pesos.

The total value of the year's production of silver and gold was 124,543,565 pesos.

### BRITISH COLUMBIA'S ORE SHIPMENTS.

Th total ore shipments from south-eastern British Columbia, for 1908, in small part estimated, are 2,066,892 tons. For 1907, the figures were 1,671,206 tons—455,586 tons increase, or 28.27 per cent.

The 1908 shipments were made up thus:—

#### Ore Shipments.

|                           |                 |
|---------------------------|-----------------|
| Boundary. . . . .         | 1,476,147 tons. |
| Slocan-Kootenay . . . . . | 294,824 tons.   |
| Rossland. . . . .         | 295,921 tons.   |
|                           | 2,066,892 tons  |

#### Smelter Receipts.

|                             |                |
|-----------------------------|----------------|
| Granby . . . . .            | 1,049,671 tons |
| B C. Copper Co. . . . .     | 364,945 tons   |
| Dominion Copper Co. . . . . | 21,872 tons    |
| Marysville. . . . .         | 5,730 tons     |
| Trail. . . . .              | 332,562 tons   |
| Le Roi . . . . .            | 85,314 tons    |

1,860,094 tons

\*Includes shipments from City of Cobalt (Cobalt), 62 tons, and Nancy Helen (Cobalt), 72 tons.

The principal Boundary shippers were:—

|                       |                |
|-----------------------|----------------|
| Granby. . . . .       | 1,049,671 tons |
| Mother Lode . . . . . | 302,069 tons   |
| Oro Denoro . . . . .  | 57,286 tons    |
| Snowshoe . . . . .    | 44,502 tons    |
| Rawhide. . . . .      | 10,740 tons    |
| Brooklyn. . . . .     | 6,800 tons     |
| Sunset. . . . .       | 3,802 tons     |

Chief among the Rossland shippers were:—

|                                |              |
|--------------------------------|--------------|
| Centre Star . . . . .          | 177,389 tons |
| Le Roi . . . . .               | 76,967 tons  |
| Le Roi No. 2 . . . . .         | 28,871       |
| Le Roi No. 2, milled . . . . . | 11,270       |

The leading Slocan-Kootenay shippers were:—

|                                    |              |
|------------------------------------|--------------|
| Whitewater. . . . .                | 1,047 tons   |
| Whitewater Deep . . . . .          | 1,027 tons   |
| Whitewater Zinc (Okla.) . . . . .  | 6,800 tons   |
| Whitewater Zinc (Europe) . . . . . | 350 tons     |
| Whitewater Deep, milled . . . . .  | 30,600 tons  |
| St. Eugene . . . . .               | 25,000 tons  |
| St. Eugene, milled . . . . .       | 145,000 tons |
| Queen. . . . .                     | 1,063 tons   |
| Queen, milled . . . . .            | 11,850 tons  |
| Blue Bell . . . . .                | 2,152 tons   |
| Blue Bell, milled . . . . .        | 21,500 tons  |
| Granite-Poorman, milled . . . . .  | 10,800 tons  |

In considering the appended table it is to be noted that progress is evident in the production of everything except

lead and placer gold. Although more copper was produced in 1908 than in 1907, yet the drop in price that that metal suffered caused the principal loss to the mining industry of British Columbia. Had the price of copper held steady, this year's total value of mineral production would have exceeded \$26,000,000.

TABLE SHOWING AMOUNT AND VALUE OF MINERAL PRODUCTS FOR THE YEARS 1907 AND 1908.

| Mineral.            | 1907.      |              | 1908.      |              |
|---------------------|------------|--------------|------------|--------------|
|                     | Quantity.  | Value.       | Quantity.  | Value.       |
| Gold, placer, oz..  | 41,450     | \$828,000    | 34,100     | \$682,000    |
| Gold, lode, oz. .   | 196,179    | 4,055,020    | 256,000    | 5,291,520    |
| Total gold, oz.     | 237,629    | \$4,883,020  | 290,100    | \$5,973,520  |
| Silver, oz. ....    | 2,745,448  | 1,703,825    | 3,037,000  | 1,518,500    |
| Lead, lb. ....      | 47,738,705 | 2,291,458    | 43,775,000 | 1,654,695    |
| Copper, lb. ....    | 40,832,720 | 8,166,544    | 43,885,000 | 5,792,820    |
| Zinc & iron, tons   | 2,856      | 50,600       | 10,000     | 280,000      |
| T'l. metalliferous. |            | \$17,095,447 |            | \$15,219,535 |
| Coal, tons (2240    |            |              |            |              |
| tons. ....          | 1,800,067  | 6,300,235    | 1,700,000  | 5,950,000    |
| Coke, tons (2240    |            |              |            |              |
| tons. ....          | 222,913    | 1,337,478    | 248,000    | 1,488,000    |
| Building material,  |            |              |            |              |
| etc. ....           |            | 1,149,400    |            | 1,200,000    |
| Total mineral       |            |              |            |              |
| production. . .     |            | \$25,882,560 |            | 23,857,535   |

### COBALT ORE PRODUCTION.

Estimated Value for Three-Quarters of 1908, and for the Year 1908.

| High Grade Ore—             |          |      |        |              |              |
|-----------------------------|----------|------|--------|--------------|--------------|
| Smelter.                    | Tons per |      | Total  | Ozs. per ton |              |
|                             | Cars.    | Car. |        | of Ore.      | Total Ozs.   |
| Deloro .....                | 36       | 30   | 1,080  | 2,500        | 2,700,000    |
| Thorold .....               | 6        | 30   | 180    | 2,000        | 360,000      |
| Copper Cliff....            | 130      | 30   | 3,900  | 2,000        | 7,800,000    |
| Perth Amboy...              | 27       | 30   | 810    | 2,000        | 1,620,000    |
| Balbach .....               | 30       | 30   | 900    | 2,000        | 1,800,000    |
| Toronto .....               | 2        | 30   | 60     | 2,000        | 120,000      |
|                             | 231      |      | 6,930  |              | 14,400,000   |
| Low Grade Ore—              |          |      |        |              |              |
| Carnegie .....              | 59       | 30   | 1,770  | 150          | 265,000      |
| Chrome .....                | 63       | 30   | 1,890  | 200          | 378,000      |
| Trail .....                 | 3        | 30   | 90     | 200          | 18,000       |
| Denver .....                | 212      | 30   | 6,360  | 150          | 954,000      |
| *Swansea .....              | 8        | 20   | 160    | †            | 32,000       |
| *Germany .....              | 7        | 20   | 140    | †            | 28,000       |
| Low Grade.....              | 352      |      | 10,410 |              | 1,675,000    |
| High Grade ....             | 231      |      | 6,930  |              | 14,400,000   |
| Total.....                  | 583      |      | 17,340 |              | 16,075,000   |
| Three-quarters of Year..... |          |      |        |              | \$ 8,037,500 |
| Year, pro rata .....        |          |      |        |              | 10,716,666   |

\*Silver at 50c. per oz. Ores of cobalt.

†\$2,000 for one car

### COBALT ORE SHIPMENTS BY MINES FOR YEAR 1908.

|                              |         |       |
|------------------------------|---------|-------|
| Buffalo .....                | 536.90  | Tons. |
| City of Cobalt.....          | 711.04  | "     |
| Chambers-Ferland .....       | 233.89  | "     |
| Coniagas .....               | 610.25  | "     |
| Cobalt Central .....         | 276.79  | "     |
| Crown Reserve .....          | 652.75  | "     |
| Silver Queen .....           | 885.69  | "     |
| Casey Cobalt .....           | 10.00   | "     |
| Cobalt Lake .....            | 225.97  | "     |
| Drummond .....               | 1164.72 | "     |
| Foster .....                 | 191.20  | "     |
| Kerr Lake .....              | 659.96  | "     |
| King Edward .....            | 322.19  | "     |
| La Rose .....                | 4797.73 | "     |
| McKinley-Darragh .....       | 1809.39 | "     |
| Nipissing .....              | 3474.50 | "     |
| Nova Scotia .....            | 237.95  | "     |
| Nancy Helen .....            | 301.32  | "     |
| O'Brien .....                | 3439.09 | "     |
| Peterson Lake .....          | 40.67   | "     |
| Provincial .....             | 75.84   | "     |
| Right-of-Way .....           | 750.04  | "     |
| Silver Bar .....             | 58.00   | "     |
| Silver Cliff .....           | 160.43  | "     |
| Silver Leaf .....            | 197.03  | "     |
| Temiskaming .....            | 794.61  | "     |
| Temiskaming & Hudson Bay.... | 1094.23 | "     |
| Townsite .....               | 177.71  | "     |
| Trethewey .....              | 1309.91 | "     |

Total, 24,079.80 tons for 1908.

### SILVER PRICES.

| 1908.            |     |  | New York. | London.  |
|------------------|-----|--|-----------|----------|
|                  |     |  | cents.    | pence.   |
| December 26..... | 49¼ |  |           | —        |
| " 28.....        | 49¾ |  |           | 22 15-16 |
| " 29.....        | 49¾ |  |           | 22 15-16 |
| " 30.....        | 50¼ |  |           | 23 ½     |
| " 31.....        | 50¼ |  |           | 23 3-16  |
| 1909.            |     |  |           |          |
| January 2.....   | 50¼ |  |           | 23 3-16  |
| " 4.....         | 50¼ |  |           | 23 3-16  |
| " 5.....         | 50½ |  |           | 23 5-16  |
| " 6.....         | 50⅞ |  |           | 23¾      |

The average price of silver for the year 1908 was 52.871 cents per ounce.

The monthly averages, New York, were as follows:—

|                 |        | Average-Price |
|-----------------|--------|---------------|
|                 |        | of Silver     |
|                 |        | per ounce.    |
| 1908.           |        |               |
| - January ..... | 55.678 | cents         |
| February .....  | 56.011 | "             |
| March .....     | 55.365 | "             |
| April .....     | 54.500 | "             |
| May .....       | 52.795 | "             |
| June .....      | 53.663 | "             |
| July .....      | 53.115 | "             |
| August .....    | 51.688 | "             |
| September ..... | 51.720 | "             |
| October .....   | 51.431 | "             |
| November .....  | 49.720 | "             |
| December .....  | 48.769 | "             |



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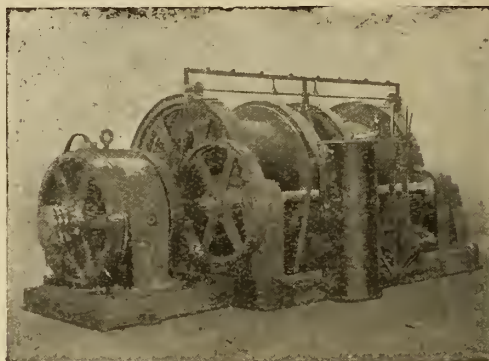
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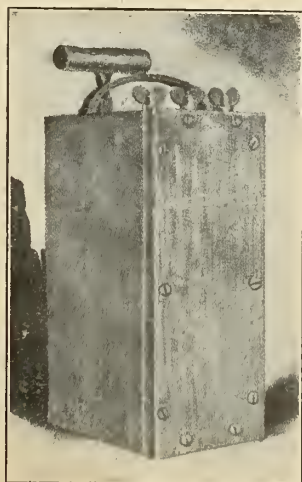
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We offer you a simple, durable, "fool-proof" machine which we will guarantee will do more work than any similar machine on the market at less cost for maintenance.

WRITE TODAY FOR BULLETIN NO. 40.

**The Canadian Cleveland Drill Co., Ltd.**  
Cobalt, Ontario.

ROCK DRILLS, PNEUMATIC TOOLS, HOSE, DRILL STEEL, ETC.

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### THE JEFFREY CENTRIFUGAL MINE FAN DEVELOPS

LARGER VOLUMES AT LOW SPEEDS AND LARGER CAPACITIES AGAINST HIGH CAUGES THAN ANY OTHER FAN MADE.

This claim is made advisedly and will be substantiated by definite figures of actual demonstration.

Showing Wheel with Special Vanes  
and Conical Scoops  
A Steel Casing Extending to Ground  
Line Eliminates Much Masonry  
Ordinarily Used

We have installed a 10 x 5 ft. fan at our works in Columbus where tests will be made for interested parties.

IT WILL PAY YOU TO INVESTIGATE

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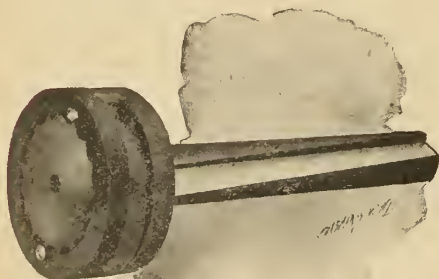
**THE JEFFREY MFG. CO., Columbus, O, U.S.A.**

New York    Knoxville    Chicago    Charleston, W. Va.    Boston    Pittsburgh    St. Louis    Denver    Montreal, Can.

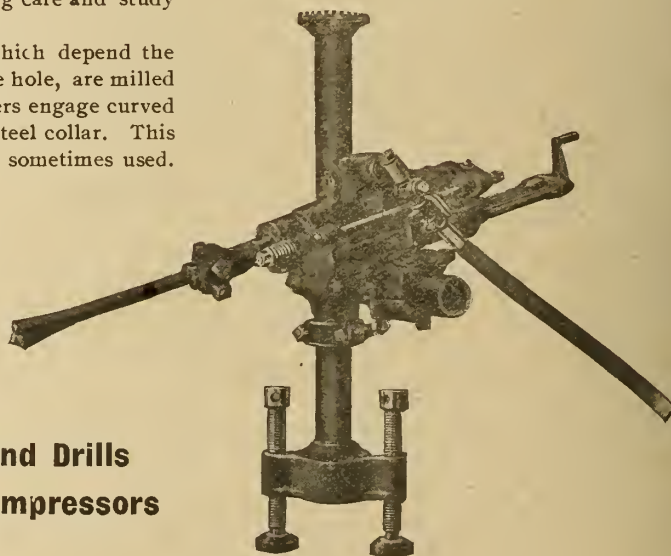
## The Repair Economy

for which **Sullivan Drills** are noted is due to unceasing care and study spent upon their construction.

For example, the rifle bar and ratchet head, on which depend the proper rotation of the drill steel and the "mudding" of the hole, are milled from one solid bar of steel, and hardened in oil. Steel rollers engage curved ratchet faces and bear against pockets in the hardened steel collar. This device is much more durable than the teeth and pawls sometimes used. Catalogue 660.



**Diamond Drills  
Air Compressors**



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# Mining Machinery

## ROCK DRILLS

2¾ in. x 6¼ in., 3 in. x 6 in., 3½ in. x 6 in., 3¾ in. x 7¼ in., slightly used.

## HOISTING ENGINES

5 in. x 7 in., 6½ in. x 8 in., 7 in. x 10 in., 8 in. x 12 in. Double cylinder, single drum.

## AIR COMPRESSORS

6 in. x 6 in. and 12 in. x 12 in. Steam actuated.

## LOCOMOTIVE BOILERS

28, 35, 40 and 50 h.p.

## STEEL HOSE and COUPLINGS

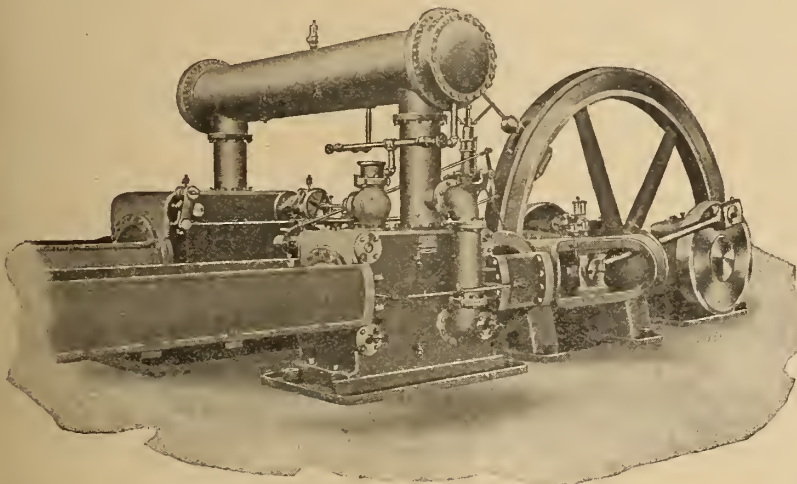
All standard sizes in stock.

# The A. R. Williams Machinery Co., Limited

Head Office: TORONTO, Branches: MONTREAL, WINNIPEG, VANCOUVER.

Manufacturers, Importers, and Dealers in all kinds of Engines, Boilers, Machinery and Supplies

## Corliss Steam Driven Air Compressors



Corliss Steam Engine of a Rand Air Compressor.

The efficiency of the Corliss Steam Driven Air Compressor in fuel consumption, automatic regulation and smooth action is generally conceded by the engineering world. By reason of its strength, durability and reduction of clearance losses to a minimum when running at speeds permissible in air compression, the Corliss engine is especially adapted as the power end of an air compressor.

Designed to fill the demand for an air compressor of the highest possible efficiency, our Class "BB-3" is producing results in actual operation which we can confidently place in comparison with those of any other machine now in the market. We feel that the compressors of this type which we have running in the various industrial and mining centres of Canada are the best testimonials which we have of our success in the production of air compressor efficiency.

**"THE BEST IS THE CHEAPEST". Get our Estimates.**

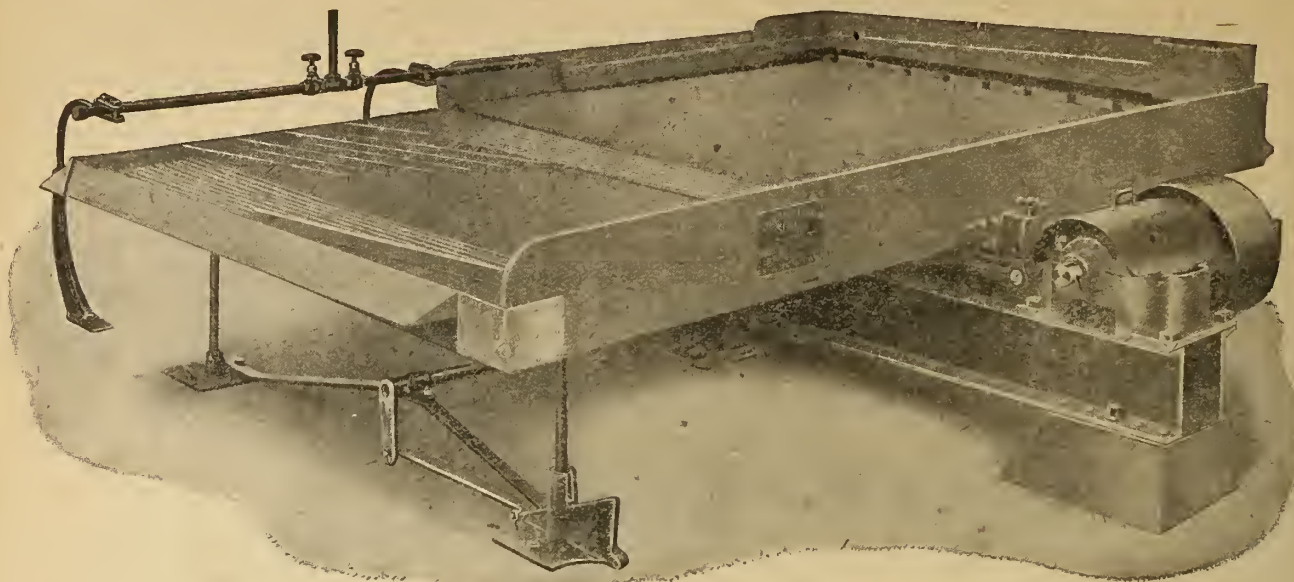
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The greatest advance in slime concentration attained in recent years has been accomplished by this table. Its success is emphasized by the fact that as the result of an elaborate competitive test with vanners of various makes **70 of these Tables are now in operation in the new mill of the Goldfield Consolidated Mines Co., Goldfield, Nevada**

This should draw the attention of all mill men. Send for Nos. 1, 2, and 3 Catalogues.

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Established 1867

B. E. WALKER, President

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| <b>Rest, - - -</b>      | <b>6,000,000</b>    |

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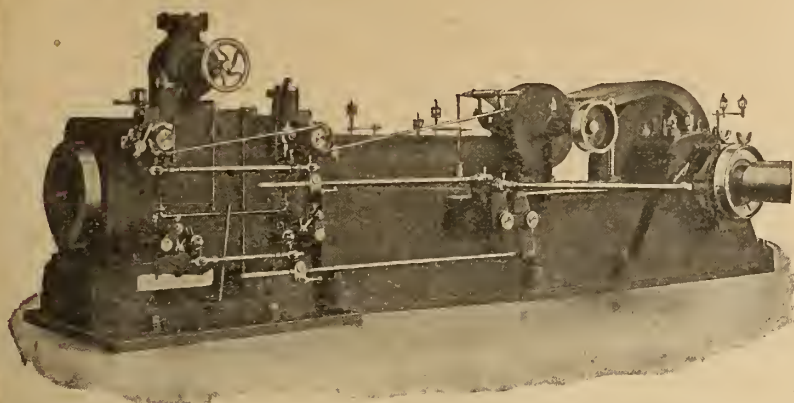
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Mining properties examined  
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Write for prices for  
Ore analysis.

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plants in Canada.

**THERE MUST BE A REASON**

They are giving satisfaction to all users, and are designed to give the highest possible efficiency, for direct connection, belted or rope drive.

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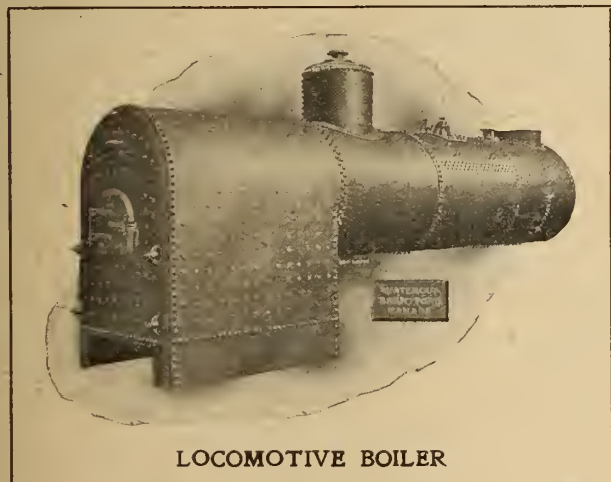
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30—40—50—60 H. P.

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8 72 x 18

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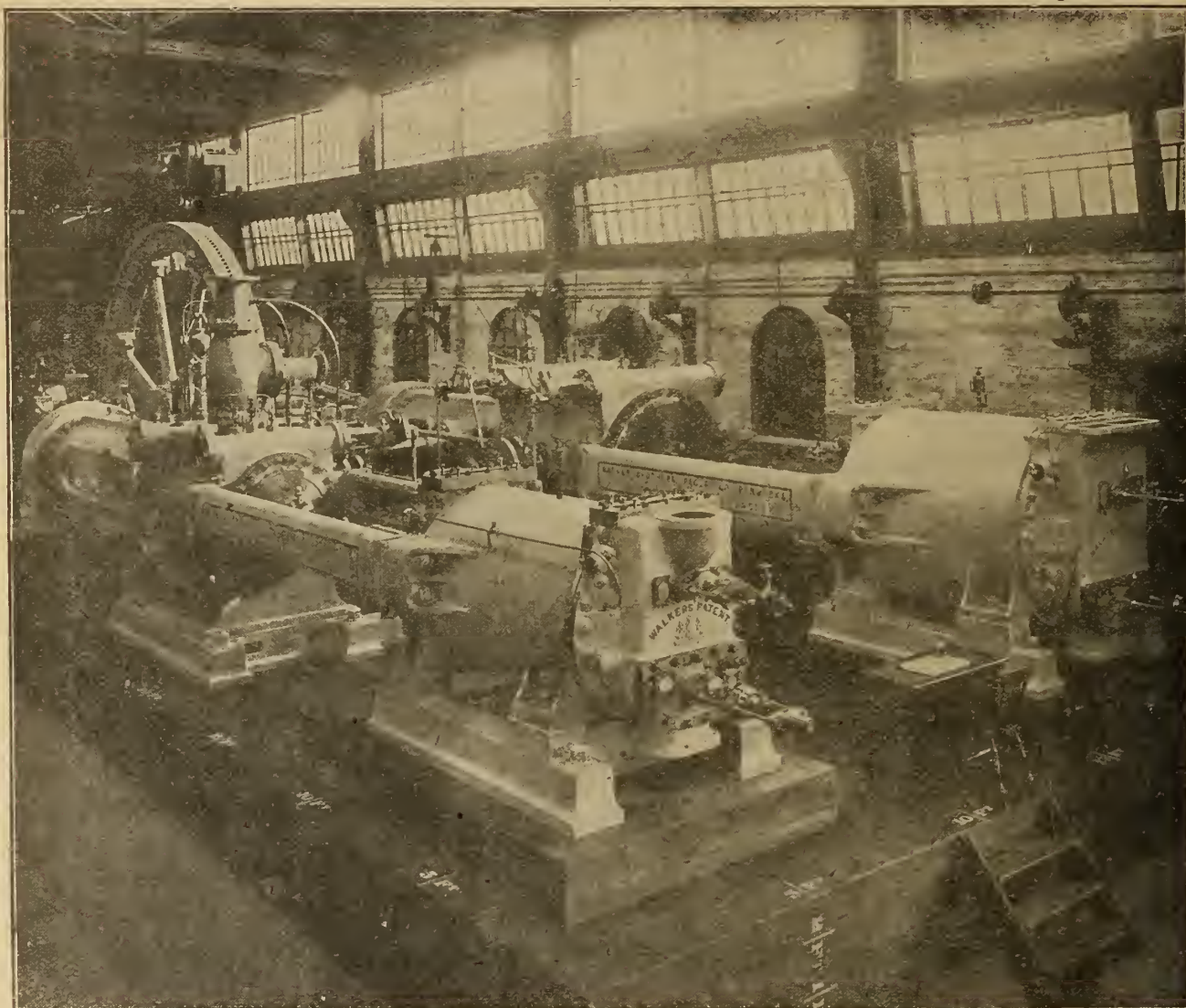
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## Wigan, England



## Largest Air Compressors in Canada

are of **WALKER BROTHERS (Wigan) LIMITED** manufacture.

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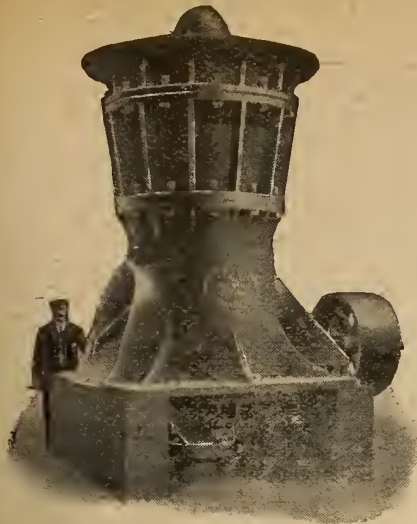
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## PEACOCK BROTHERS

CANADA LIFE BUILDING,  
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is used for all the wearing parts. This steel is the supreme material for  
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## Steel Castings for Collieries, Mines, etc.,

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Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

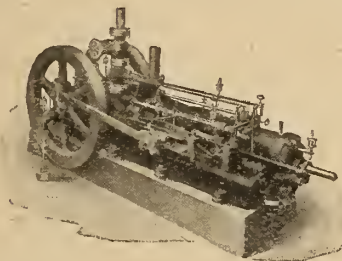
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## INGERSOLL-SERGEANT OF CANADA, LIMITED.

ROCK DRILLS

COAL CUTTERS

AIR Compressors



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QUALITY UNSURPASSED  
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CAPACITY UNEQUALLED IN CANADA

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SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS.

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**NEW GLASGOW, NOVA SCOTIA**

## THE Bennett Fuse

Crown Brand



MANUFACTURED BY

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CANADIAN OFFICE:

**The Giant Powder Company, Con.**  
VICTORIA, B.C.

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We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., \$400 to \$10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

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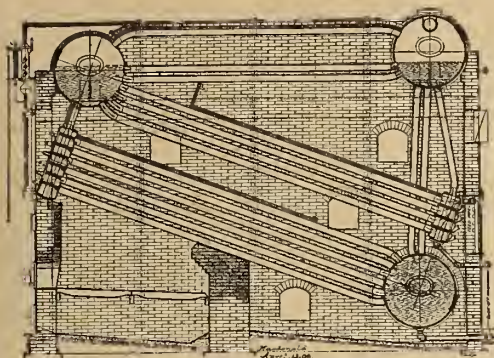
Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

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Free expansion of tubes. Perfect water circulation. Dry or superheated steam. Half the usual number of handholes.

**Robb Engineering Co., Ltd., Amherst, N.S.**

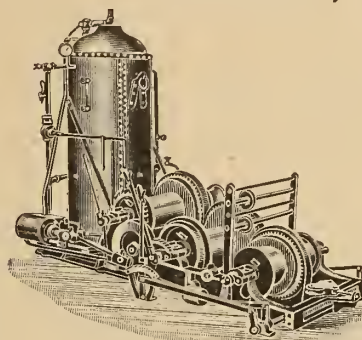
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Limited

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Manufacturers of

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## DOMINION BRIDGE CO., LTD., MONTREAL, P.Q. BRIDGES

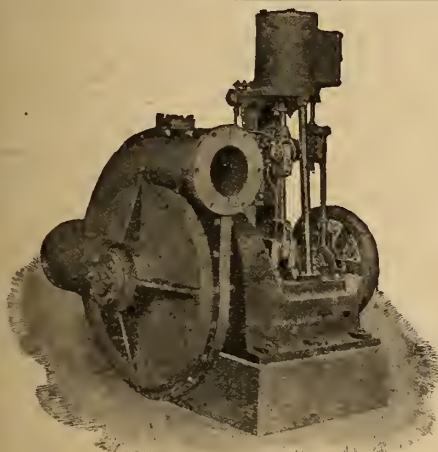
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STEEL BUILDINGS

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Structural METAL WORK of all kinds

**BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK**



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Centrifugal Pumping Machinery for various Industrial Purposes

We are building a special solid steel lined pump for handling tailings or slimes in gold mining. Estimates furnished upon application for pumping outfits for special purposes. Write for catalogue.

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## STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

The **FLORY CABLEWAY SYSTEM** is Superior to any on the Market

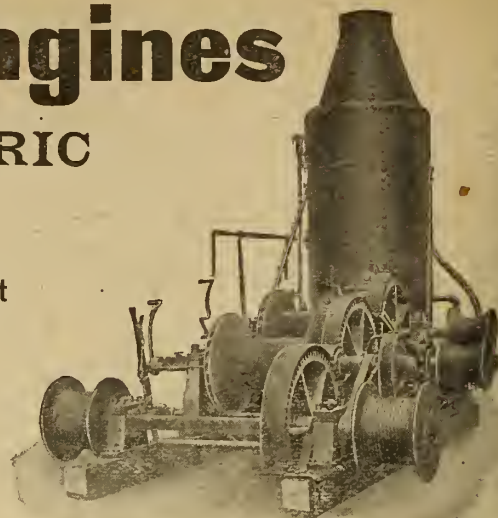
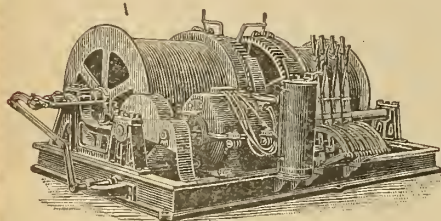
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MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to  
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All types and sizes. Complete outfits. Write for catalogue

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FROM **10.15** P.M.  
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New Equipment  
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## Absolutely Dustless The Behrend System

The Behrend Dry Concentrator is a portable and very durable machine, requiring only  $\frac{1}{2}$  horse power to operate. Capacity 8 to 15 tons per day, according to sizes of material under treatment, averaging about 12 tons.

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Makes clean separation of zinc and lead sulphides. Works equally well on ores of all sizes from 8 to 100 mesh, and saves the slimes.

Unrivalled as a clean-up machine in placer work, recovering the black sand, gold and platinum.

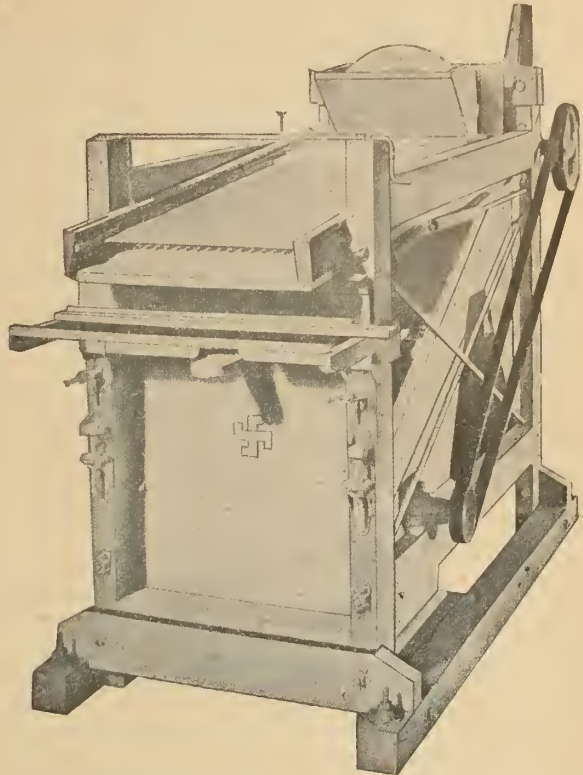
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Write us for descriptive pamphlet. Forward sample of your ore for preliminary test.

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The Underwood is the aristocrat of the typewriter world.

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NOTE. We personally break (in this country) our carbons, thereby enabling us to determine accurately their quality. We deal only in very best quality and are always ready to ship goods on approval and for selection to responsible parties. Write us.

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Catalog  
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All steel with frame of Koppel special wide flange channel. Capacity 18 to 27 cu. ft. Gauges 18 to 24 in.

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Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.

**To Date 34 Lives Saved by Its Use**



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All Sizes and to any Pressure

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For Stationary, Marine and Locomotive Boilers

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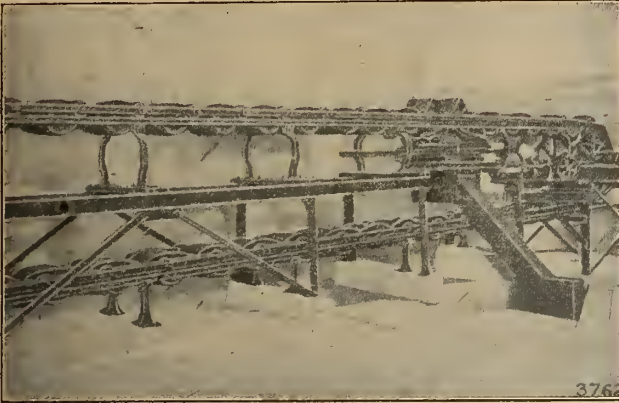
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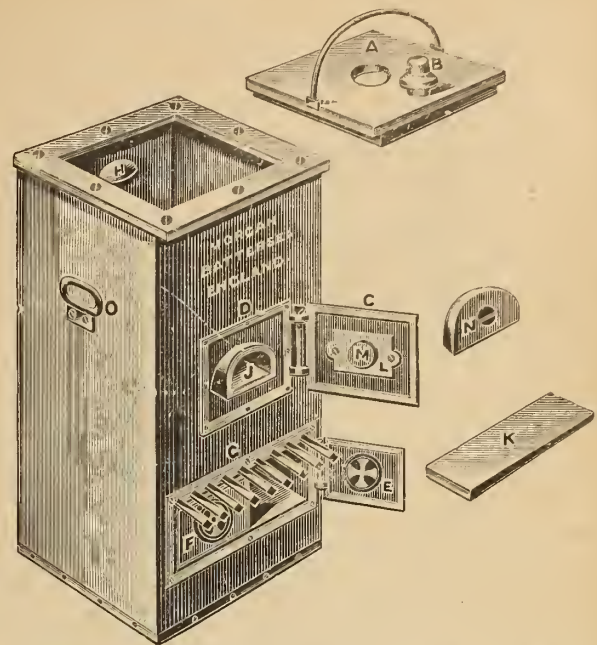


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for Cement, Coal, Coke, Ashes, etc.

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Morgan's Battersea Prospector's Furnace, for Muffle or Crucible work. Will accommodate size J muffle (12 in. x 6 in. x 4 in.) or No. 20 Salamander Crucible (40 lbs. capacity.)

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WIRE ROPE MANUFACTURERS,

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## Speciality.

MINING ROPES OF ALL DESCRIPTIONS, made from the highest quality of Swedish Material, with high tensile stress and great ductility.

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are made of the hardest bronze alloys to limit gages and strictly interchangeable.

On such parts as telescope tube axes, enters and sockets our maximum error limits is but

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from Standard dimensions.

## Ainsworth Precision Balances...

have been on the market for nearly 30 years and have become the world's standard for **Design, Workmanship and Accuracy**, and our annual output exceeds 1,000 fine balances.



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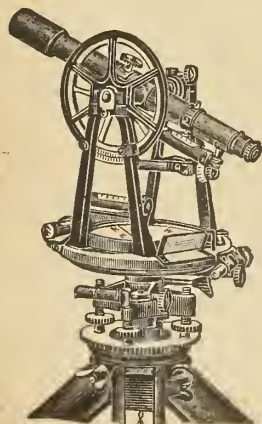
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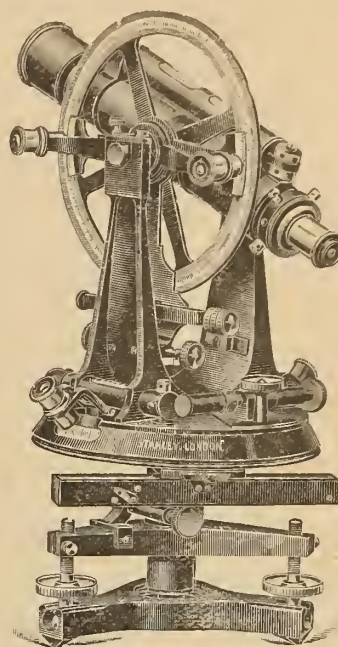
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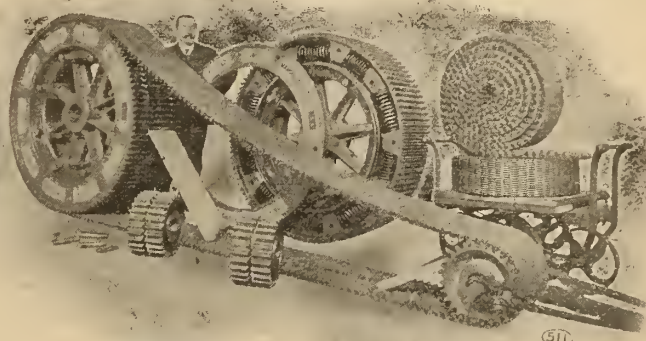
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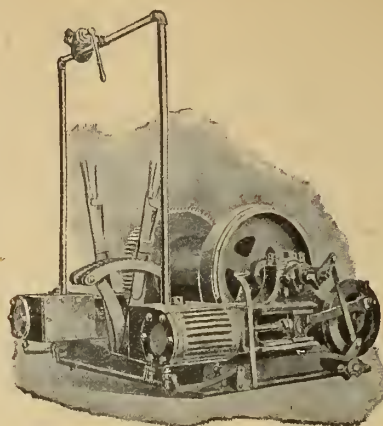
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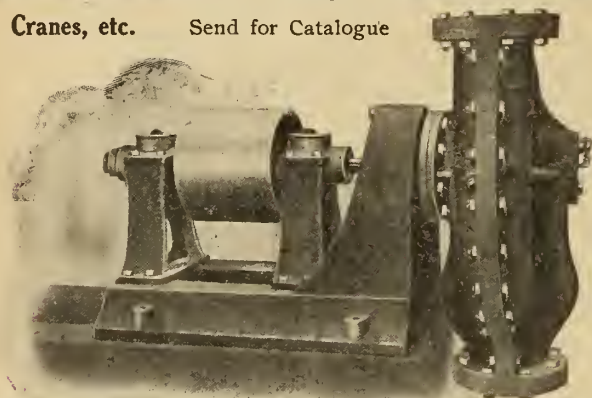
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, February 1, 1909

No. 3

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

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Published fortnightly by the

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### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

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**Natural Oil and Gas:** Eugene Coste, M.E., Toronto, Ont.

## JUSTICE.

Whatever delays and dallyings there may have been in bringing to justice the perpetrators of the Highland Mary-Lucky Boys-Blue Bell group of swindlers, there is satisfaction in recording that the integrity of the law has at last been vindicated. On Saturday, Jan. 16, 1909, Frank Law, one of the chief promoters of these swindles, was adjudged guilty by the jury of the Court of General Sessions. Later, on Jan. 26th, he was sentenced to five years in Kingston Penitentiary by Judge Winchester.

Here, so far as we are concerned, the history of Frank Law closes. We derive no satisfaction from the fact that a fellow citizen has brought disgrace and suffering upon himself and his family. But we are convinced that the whole sordid story will act as a deterrent upon others who may look upon the flotation of bogus mining companies as a legitimate source of wealth.

In considering the history of mining company promotion there are two features that obtrude themselves most unpleasantly. The first is that, almost without exception, the worst of these schemes were those that advertised most extensively in several of the daily newspapers. Looking over the columns of the Toronto World for 1907 we notice thirty large advertisements (including those of Law & Company). Five of the promoters of these concerns are now fugitives from justice. The shares of not one of the thirty companies are worth purchasing to-day. This is indeed a startling indictment.

The second feature that demands remark is the aid given to all of the most unsavory fakirs by members of the legal profession, a profession whose honorable traditions are out of all keeping with this discreditable practice.

It is fair to argue that a promoter's legal adviser has more than usual opportunities of acquiring inside knowledge of the moral standing and business methods of his client. How then can there be justification for a lawyer lending his own or his firm's name to the most egregious schemes for robbing people who happen to have confidence in that name? Has the lawyer no duties as a citizen? Do his legal attainments necessarily place him beyond the pale of the moral code?

Frank Law was not the only malefactor in the case that has just been brought to a conclusion. Equally guilty were Russell, and, probably, Abendroth. But the history of the case reveals the fact that there was an intimate connection between the office of Lennox & Lennox, barristers, and the operations of Frank Law & Company. One member of the former firm was president of Silver Bird. Another was discovered to

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be the author of the famous "Michael Macdonald Report" on Highland Mary.

We believe that the great bulk of practising lawyers in Toronto, and, indeed, in Canada generally, would refuse utterly to touch such promotions as those alluded to above. We also believe that no members of the profession should be allowed to bring it into evil repute by making easy the path of the mining fakir.

Similarly it should be impossible for any newspaper to become the incubator of swindles without losing its fair name.

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## REPORT ON THE MINING AND METALLURGICAL INDUSTRIES OF CANADA.

When it was announced about two years ago that the Mines branch of the Department of Mines, Ottawa, had received instructions to collect and publish full information concerning the mining and metallurgical industries of Canada, few people had any conception of the magnitude of the work. Whilst it was universally acknowledged that some attempt to present in accessible and compact form the mass of data obtainable, the impression was current that this would not necessarily consume more than six or eight months. However, the event has proved that a practically complete description of the mining and metallurgical activities of Canada requires a volume of 972 pages, embodying the labors of a large special staff over a period of at least eighteen months.

The bulky volume before us is not, however, to be taken as the final and definitive result of two years' labors. Whilst in its present form it is undoubtedly valuable, it will prove of but ephemeral interest unless revised editions are brought out periodically. Hence, this report may be regarded as providing not only present information that will prove of business value to all classes of investors, but as forming a working basis for an annual publication that will provide an immensely useful source of reference. And this, we believe, is in accordance with the plans of the Department of Mines.

In view of the large sums of money expended in the preparation of this report the Department has decided to fix its price at one dollar per volume. This nominal price will deter no one interested in the mining industry from securing a copy. It will have the effect also of preventing irresponsible persons from trespassing upon the generosity of the Department.

It is probable that had the various operating companies been grouped by industries instead of by territorial divisions, the report would have been more compact and even easier of reference. This is, however, not a matter that detracts seriously from the publication. No doubt the former plan would have been more costly and, under present circumstances, less complete.

We may also suggest that an arrangement whereby the general information is thrown together in the first part of the volume, and all data as to the personnel of

directorates, etc., placed in smaller type at the back of the report, would render the bringing out of new editions much less laborious.

On another page we print a more complete notice of the report. Here, however, we may place upon record our belief that the appearance of this comprehensive review of Canada's mining and metallurgical industries is an event of prime significance. Following last summer's efforts of the Canadian Mining Institute it should make our country's resources known all over the world.

We congratulate the Minister of Mines and the officers of the Department upon a monumental work achieved.

---

## FEES AND THE MAN.

Except under extraordinary circumstances it is bad business for the mining engineer to work openly for small or nominal fees. We need not reiterate here all the reasons that justify the consulting engineer in charging substantial amounts for his time and services. It will suffice to mention that in his advisory capacity the mining engineer assumes large responsibilities. His periods of employment are not continuous. Often he may suffer long periods of idleness. Hence, it is consistent neither with his actual needs nor with his professional dignity that he should work for insufficient fees.

A Montreal mining man, ostensibly a mining engineer, advertises in a daily paper the fact that he gives free advice on Cobalt mines and stocks. If one thing is more certain than certainty itself it is that advice thus offered is not worth taking. As to what returns for his trouble the alleged mining engineer expects we may venture a shrewd guess. What his confiding clients must receive will prove an exact equivalent of what they give.

---

## THE MINING ENGINEER'S REPORT.

As to what a mining engineer's report should contain there is a wide divergence of opinion. Some there are who contend that the mining engineer's opinion is the essential element. They argue that, since the mining engineer is a trained specialist, therefore his conclusions, drawn from careful examination of any mine or prospect, are the whole soul of the report.

The subject is one that requires handling with gloves; but there can be no harm in glancing at the other side of the question.

To a person totally unacquainted with mines and minerals, the interior of a mine is much the same as an inordinately large cellar. Unless his eye is caught by the actual glint of gold, or by some other such arresting phenomenon, he carries away merely an impression of gloom. Not only is he unable to interpret the very features that appeal to the mining engineer, but he is



actually incapable of observing them. To a greater or less degree this is true of all untrained persons, from the honest miner down to that worst product of the devil, the "mining expert." Long training, keenness of vision, scrupulous honesty, and adequate experience are necessary to qualify a mining engineer to *observe* the geological, mineralogical, and other facts, and to record them properly. To see in their true light the *facts* concerning labor, transportation, market, water, fuel, timber, and the multitudinous other factors that affect all mines, is by no means an easy task. To write of what his professional training has enabled him to see, is even harder. For the engineer is called upon not to disguise his thought in the cheap jargon that the "mining expert" employs on his victim as an anaesthetic. He should set down his facts so clearly, so fully and so accurately that they will be intelligible to any educated man of business.

It is highly probable that the engineer who is able to write such a report as that outlined above, is the person best qualified to draw logical conclusions from the facts recorded. And the engineer's opinion is naturally, that part of the report that is considered most valuable by his clients. But the best opinion has in it more or less of human error. Faulty logic may mar an otherwise unexceptionable document. The "mining expert's" deal with a minimum of fact and a maximum of opinion. The mining engineer owes it to himself and to his clients to present not only his opinions, but also the grounds upon which his opinions are based. Then his recommendations will stand upon their own merits, and not upon the unsafe foundations of professional prestige and public ignorance.

### SUFFERING CANADA.

When, not long ago, President Roosevelt organized his famous Annanias Club, membership in which was entirely voluntary, the persons whom he singled out as charter members were the nature-fakirs.

Lately an enterprising magazine has been corraling a bunch of "Canada-fakirs," writers who toy with snow and thermometer at the expense of the Canadian climate. Ignorance and the exigencies of modern novel manufacturing do not justify the practice of libelling our country. There is ample color in facts and there is no difficulty nowadays in obtaining facts.

Except for occasional magazine writers who sometimes select a misty mine as a background and who make as many breaks as space will permit, the mining industry has suffered little at the hands of fictionists. The most that can be said of casual writers about the mineral wealth of the Dominion is that the knowledge behind their allusions is inadequate; even if the writers' goodwill is undoubted.

A case in point is furnished by Miss Agnes Laut, whose "Conquest of the Great Northwest" has recently been published. The book describes the explorations

that began with Hudson's voyage of three hundred years ago, and is based mainly upon Hudson Bay Company records, some of which are brought to light for the first time by Miss Laut.

The Company made several attempts to discover minerals. The expedition of Captain Knight, in 1719, perished on Marble Island, in the northwest part of the Bay. Samuel Hearne's trip to the Coppermine River, in 1770, brought fame to him but no dividends to the Company. Other rumours of minerals on the interior were not regarded seriously. Miss Laut refers to them: "There were legends, too, at Moose and Rupert of great silver mines [what is a mine?] toward Temiscamingue—the field of modern cobalt beds." . . . "How true some of these legends were has been proved by the great cobalt mines of Modern Ontario."

No reader of Miss Laut could suppose that silver is being mined in the Temiscamingue. She evidently supposes that only cobalt is found at Cobalt, and, also, that cobalt is something akin to peat or asphalt. "Cobalt beds" is a delightfully feminine description. Imperfectly informed persons, who have heard of Cobalt, might even believe that Miss Laut wishes them to understand that there is no silver in the district. It is to weep that Canadian writers at least do not give the whole truth about matters on which they write with every assurance of authority.

There can be no fair complaint to-day either of lack of authentic information concerning Canada, or of dearth of inspiration in the history of the Canadian nation. The story of the Hudson Bay Company is romantic enough to satisfy the most imaginative. And, coming down to our own times, there is no better reading to be found than many of the records of explorations conducted by Canadians. Take, for instance, Dr. Low's "Cruise of the Neptune," a simple, direct narrative of adventure in our northeastern sub-arctics; or J. W. Tyrrell's "Across the Sub-Arctics of Canada." Both these books should be available to every school child. Mr. Tyrrell's book, descriptive of an arduous journey undertaken by himself, and his brother, Mr. J. B. Tyrrell, is a straightforward, unornate story of adventure in the great barrens of northwestern Canada and the Hudson Bay region. In due time it will be looked upon as a classic, not alone because we know it to be scientifically accurate, but also because it is as entertaining as the best novel. At present the Canadian public is content to assimilate silly libels on its climate and resources, dished out by persons whose knowledge of the country is both inaccurate and scanty.

An important witness in giving evidence before the Royal Commission on safety in mines, declared himself to be opposed to frequent inspection of collieries. The Government inspector, he contended, should always be equal or superior to a manager. The working-man grade of inspector would be an anomaly.



**EDITORIAL NOTES.**

The Eleventh Annual General Meeting of the Canadian Mining Institute will be held in Montreal, at the Windsor Hotel on the 3rd, 4th, and 5th of March, 1909. The list of papers to be presented is already large and is being added to from day to day. Information as regards railway arrangements, etc., appears on another page in this issue. We commend it to the careful attention of our readers.

Mr. J. B. Tyrrell has been advised of his election as corresponding member of the Council of the Institution of Mining and Metallurgy, London, England. This is a signal honor. The Institution of Mining and Metallurgy is the most carefully organized body of its kind. Membership is only attainable by professional men of high standing, unblemished reputation and a long record of practical service. Election as corresponding

member of the Council is, of course, a still higher honor.

The Cobalt representative of Beer, Sondheimer & Co., 42 Broadway, New York, has drawn our attention to an inaccuracy that occurred in our issue of January 15th. In that issue the shipments of ore to Germany were reported as being about 140 tons of low-grade ore. These figures were hastily prepared and, in this case, were inadequate. Beer, Sondheimer & Co., during 1908, contracted for and shipped 200 tons of high-grade ore from the Temiscaming & Hudson Bay Co.; 150 tons high-grade ore from Kerr Lake; 60 tons high-grade ore from Crown Reserve; and 60 tons high-grade from Silver Cliff. In addition to these shipments two cars of low-grade ore were shipped from Silver Cliff.

The high-grade ore is sent to Hamburg, Germany. The low-grade goes to Norfolk, Virginia.

## SOME RECOLLECTIONS OF EARLY COPPER MINING IN CANADA.

Written for the Canadian Mining Journal by Dr. James Douglass.

The early records of copper mining in Canada tell a story of mingled success and failure, the failures unfortunately decidedly preponderating. Within the provinces of Quebec and Ontario, until the building of the Canadian Pacific and the discovery of the Sudbury Copper-Nickel ores, active mining in Ontario was confined to a group of mines on the shore of Lake Ontario, and a feeble attempt to work the native copper beds of Michipocoten Island. In Quebec the area of copper mining was confined to the eastern townships, where unquestionably large deposits of low grade copper ores of very different character exist.

The Bruce mines were discovered on the land of the Montreal Mining Co. on Lake Huron in 1846. An opening was said to have been first made upon them in 1847. The Wellington mines were shortly afterwards discovered, and opened on the lands of the same organization not far from the Bruce Mine. When active operations were undertaken John Taylor & Sons, of London, at the time the most noted of mine managers, took general charge, and therefore all the work and machinery above and below ground, were designed and conducted on the Cornish type. The veins on the Bruce and Wellington properties varied from a few inches to thirty feet in width, the mineral consisting of chalcopyrite associated with small quantities of iron pyrites in a quartz gangue. The ore was therefore admirably suited to yield a high concentrate to mechanical concentration. Returns of shipments from 1847 to 1860 show about 10,000 tons of concentrates averaging about 20 per cent. from the Bruce mines, and from 1847 to 1862 some 6,000 tons from the Wellington mines. The average of the ore mined is supposed to have been about 4 per cent. The highly acid character of the ore unfitted it for smelting, but attempts to smelt the concentrates with coal imported from Ohio were financially uneconomical. At that period the success attained by Henderson in leaching the Tharsis ore from

Spain by the Longmaid method induced the Company to attempt applying it to the Bruce ores. A M.-de-Bussy was sent from Europe to erect and superintend the operation of the plant. It was found, however, that while roasting with salt such highly sulphuretted ores as those from the Spanish peninsula chloridized very thoroughly the copper, the method was not as applicable to pure chalcopyrite in a silicious gangue. At any rate the method was speedily abandoned, and after that the mines remained idle for a long period of time. De Bussy's experiments were made about the year 1869-70.

About the same year as the Bruce mines were discovered, namely, 1846, copper was discovered in the township of Inverness, County of Megantic, in Lower Canada. Some very rich ores of erubescite were discovered at surface; considerable work was done and some shipments were made in 1849-1850 and 1851. The surface indications did not however lead in depth to either large or permanent deposits, and the Inverness mines were after 1851 abandoned. But prior to that time some ores of erubescite and bornite had been discovered on the farm of a Mr. Harvey in the 15th range of the township of Leeds. The Quebec and St. Francis Mining Company was organized in 1847 to develop this property. John Arthur Phillips, then the most noted authority in England, was sent out in 1852 to report on the property by John Taylor & Sons. He was impressed but not persuaded. Subsequently, however, English capital was enlisted, and the English and Canadian Mining Company was organized. It erected concentrating works of the Cornish type, and carried on operations for some twenty years, though during half that period the Canadian stockholders owned the whole stock of the Company. The result of their operations went to show that the rich veins which appeared at surface, though they cut across the shales of the Quebec Group, were not continuous for any long



distance, and terminated, at a comparatively shallow depth, in a bed of slate lying conformably with the strata and carrying, in seams and in disseminated particles, from  $1\frac{1}{2}$  to  $3\frac{1}{2}$  per cent. of copper. Beneath this bed, and apparently terminating in it by a fan shaped extension of its quartzite gangue, a vein—called the Fanny Eliza—was discovered with almost verticle dip, and carrying a chute of rich ore which was ultimately extracted to a depth of several hundred feet. The bed in the vicinity of these surface and deep veins averaged over 3 per cent. of copper, but the yield fell off to about  $1\frac{1}{2}$  per cent. as extraction extended beyond the points where these veins apparently entered and left the bed. The richest portions lay between, or at no great distance from the space intervening between these veins. From that area some five or six thousand tons of ore was extracted which averaged some 3 per cent. Beyond that area, where the ore apparently averaged about  $1\frac{1}{2}$  per cent., the lower grade compelled abandonment of work on the bed proper.

But work was prosecuted on the "Fannie Eliza" vein, below the bed for years, if not at a profit, yet not at a loss. The production, of course, measured by the output of our modern establishments, was insignificant, amounting to 500 tons of 20 per cent. concentrates a year.—equivalent, therefore, to only about 200,000 lbs. of metallic copper. This however, was sufficient to give the property a certain ranking, when all the mines of Lake Superior turned out only 12,000,000 pounds of copper, and the total production of the United States was only about 17,000,000 pounds.

Two other beds were cut in running a tunnel, but their value was never accurately determined. On an adjacent property the so-called "Daigle Lot" a vein of bitter spar was opened, carrying occasional grains of gold associated with bornite, but the quantity was only sufficient to raise hopes without gratifying them. The English and Canadian Mining Company was succeeded by a Scotch Company, but instead of developing its known deposits sunk its capital in looking for new ones. During the active career of the mine the concentrates had to be hauled twenty miles to the nearest station on the Grand Trunk Railway, and shipped either to England or to Baltimore. Water for concentration was collected in dams, though the south branch of the Palmer River, a stream of considerable size, was only two miles distant. It was at one time contemplated to build a tramroad from the mine to the river and there erect a concentrating plant. The more economical plan would have been to pump the water to the ore instead of hauling the ore to the water. Under these disadvantages it is almost to the credit of the mine that for a number of years it was self-supporting. This raises the question as to whether these copper-bearing beds in Leeds, Inverness, Halifax and many other localities in the eastern townships might not, with better machinery for treatment, under modern metallurgical methods, and with cheap transportation, be at some of the more favorably selected locations, worked to a profit. To all appearances there are large quantities of ore, but whether anywhere it is of a working grade can only be determined by the expenditure of more money, and so much has already been fruitlessly spent that capital has become timid. The same, however, has been true of other deposits on the continent, which were abandoned in the past for the same reason, and are today most profitably worked.

During this same early period a large body of ore was discovered at Actonvale, on the Grand Trunk Rail-

road between Richmond and St. Hyacinth. The ore—a more or less decomposed sulphide of copper—was disseminated through limestone, and in one place concentrated into a large mass which was worked very profitably by open cut from surface, and so far as published records give the figures, the Acton Mine yielded from 1859 to end of 1861—6,000 tons of 17 per cent. ore and concentrates, and during the following year about 2,500 tons of 12 per cent concentrates, which were shipped to the United States.

Meanwhile the large masses of iron and copper sulphurets near Lennoxville were discovered. The first company to work them actively was a Hartford organization, which roasted the ore in heaps and ran it down into matte. Recognizing the waste inherent in such an operation, the company erected sulphuric acid works on the south shore opposite Quebec, with a view of making superphosphates out of the apatites from the Ottawa. The intention and the enterprise thus shown were admirable, but may be assumed to have been financially disappointing, for that company and its works in time disappeared. A Montreal company applied the Hunt & Douglas wet process unprofitably. Another attempt was made by a Scotch company to leach the ores by the Longmaide-Henderson method, which we have already referred to as having been applied unsuccessfully to the Bruce ores of Lake Huron. The Ascot ores were from a mineralogical point of view admirably suited. Nevertheless the experiment was financially unsuccessful. But for years the ores of that district have at least been profitably mined and worked under the admirable management of the Nichols Copper Company, who mine the ore, utilize so much of it as can be advantageously disposed of, in making sulphuric acid on the spot, and ship the balance for chemical and metallurgical treatment to their large works at Laurel Hill, Long Island. Another United States company—Orford Company—worked one of their deposits in the seventies and erected their Orford Works, in New Jersey, to treat them. The mines are still worked by some of the same owners—but the connection of the mines with the large owners, to which they gave their name—was long ago dissolved.

#### CANADIAN MINING INSTITUTE ELEVENTH ANNUAL MEETING.

The Eleventh Annual General Meeting of the Institute will be held in the city of Montreal, on Wednesday, Thursday and Friday, March 3rd, 4th and 5th, 1909.

The Institute headquarters will be the Windsor Hotel, Montreal, and members are requested to notify the Secretary as early as possible of their intentions to attend, in order that accommodation may be reserved for them.

Application has been made to the Railway Passenger Association for special transportation privileges for members and their friends attending the meeting, and the conditions under which these will be granted are as follows:—

1. A single first-class ticket must be purchased not more than three days (Sunday not to be counted a day) prior to the opening day of the meeting.
2. A standard certificate of such purchase must be obtained from the ticket agent issuing the transportation.



3. A standard certificate must be endorsed by the Secretary of the Institute and stamped by a representative of the railways, who will be in attendance at the Secretary's office, room 3, Windsor Hotel, on the three days of the meeting at hours to be bulletined later.

4. A charge of twenty-five cents (25c.) will be assessed on each certificate.

The provisional programme of the meeting is as follows: The proceedings will be opened at 10 a.m., on Wednesday by an address from the President. The Wednesday morning, and, if necessary, the afternoon session of that day will be devoted to the consideration of business affairs to be submitted to the meeting, including the report of the Council; the Treasurer's statement and balance sheet; the proposed repeal of and amendments to the by-laws; and the election of council

for the ensuing term. A selection of papers will be read and discussed on Wednesday evening, and at the Thursday and Friday sessions.

Among those who have either definitely or provisionally promised to present papers are the following: Dr. J. F. Kemp, of Columbia University; Dr. Heinrich Ries, of Cornell University; Mr. H. P. H. Brumell; Mr. W. Blakemore; Mr. H. S. Badger; Mr. R. E. Chambers; Mr. F. Cirkel; Mr. Eugene Coste; Mr. E. T. Corkill; Mr. W. D. Craig; Mr. D. B. Dowling; Dr. B. E. Fernow; Mr. S. S. Fowler; Mr. J. C. Haas; Mr. Frederick Hobart; Mr. H. E. T. Haultain; Mr. E. B. Kirby; Dr. A. C. Lane; Mr. G. C. Mackenzie; Mr. F. C. Merry; Mr. A. J. McNab; Mr. J. C. Murray; Mr. J. Obalski; Mr. D. W. Robb and Mr. George R. Smith.

The annual dinner will be held on Friday evening at 8 o'clock.

## THE MINERALS OF NOVA SCOTIA DURING 1908.

A. S. Barnstead.

The cause of Nova Scotia's general prosperity in later years lies to a very great extent in the fact that the Province possesses extraordinary wealth in her mines, resources that are appreciated alike by Government and people. While the Government owns the minerals, yet the actual mining is left to the enterprise of private capitalists who hold their rights in leases from the government. This is a source of considerable revenue to the Province and the large increase in royalties in the last dozen years has enabled the Government to enter upon a policy of expansion along other lines.

The rental exacted by the Crown is very small. A coal lease carries with it a royalty of ten cents on the long ton, though the Province made a special arrangement with the Dominion Coal Company in 1893 for a 99-year lease whereby that company pays 12½ cents per ton royalty. Two per cent. on the gross value brings a revenue of 36 cents per ounce for unsmelted gold and 38 cents for smelted gold. Five cents per ton is what the Government exacts as royalty on iron taken from the ore beds reserved by the Government. Licenses to search are issued at the rate of \$30 for an area of five square miles in the case of minerals other than gold or silver. Leases for four renewable terms of twenty years each can be selected from them at a cost of \$50.00 each, and are subject to an annual rental of \$20.00. Licenses to search for gold cost 50 cents per area and leases \$2.00 per area, of 250 feet by 150 feet, for a term of forty years.

Though general depression has affected the coal trade elsewhere, it is only since November that its effects have been noticed in a lessened activity at the coal mines. Nova Scotia has felt the stringency less severely than might have been expected. The year for some industries has been one of arrested development, and for that reason a greater expansion, especially in the coal trade, has been prevented. A summary for the 12 months past places the mineral output of the Province at \$17,412,000. This is about \$2,000,000, in excess of the value for 1907, so that a fair degree of satisfaction is generally felt. The outlook is, however, affected by two important problems, the solution of which is looked forward to with interest. There is, first, the Privy Council decision in the Dominion Coal and Steel case, which may be announced before these words appear; and, secondly, the invasion of the St. Lawrence market by the coal companies of the

United States. This dumping process has already made inroads into Nova Scotia's natural market, and how long this American aggression will continue or what remedy will be applied to conserve the St. Lawrence coal trade to Nova Scotia is still in the future.

When a few months ago, the amount of increase in the imports of American bituminous and anthracite coal into the St. Lawrence market became known, surprise was everywhere expressed and some alarm felt lest these inroads might have a serious effect on our coal industry. There is a factor in the situation that appeals with some force to the writer. It is this: American coal men are enabled to make low contracts because owing to introduction of labor saving machinery and other causes the labor cost of a ton of coal has not increased to them. To counterbalance this Nova Scotia mines are on the seaboard—the Springhill mines being the only ones not on tidal waters, and they are but 30 miles from the shipping pier. Of course, this is no handicap in view of the long hauls that American coal companies have to contend with. Our miners are well paid, none better. If the cost of living were reduced, our miners could accept lower wages and be as well, if not better, off. What remedy is to be applied? Simply this, back to the farm! The demand for labor in the mines has been so great in the past that farmers and their sons have left the plow and the hoe to shoulder the pick and shovel. As a consequence not five per cent. of the necessities of life consumed by the mining population is produced in the neighborhood of the mines. Ontario, Quebec and Prince Edward Island are supplying produce to the colliery towns, which might easily be raised in Cape Breton, Pictou and Cumberland Counties. This process of draining the farm of its workers to supply mine labor has, within the past decade or two, practically depopulated some of the rural sections and helped to create the abandoned farm problem in Nova Scotia. Added to this, were the great opportunities thought to lie in the far fields of the Western plains. The lure of the West has been a seductive one and its captives are numbered by thousands.

What better remedy is there than to point out the harvest for the farmer and market gardener in the neighborhood of the mines, and, if our own sons do not return to the farms, to induce a satisfactory immigration that will take advantage of the opportunities. Thus will the



cost of living be reduced, and, mayhap, as a direct result, the cost of coal production. It is a matter in which all must work together. There is, indeed, greater necessity for common action in view of the American competition that has lately developed in the St. Lawrence market.

But the editor has asked for some statistics of the mining industry for 1908. The prefatory note cannot be extended. The figures given are those for the Government financial year ended September 30th last. In coal th figures for the calendar year show a slight reduction from that of the fiscal year.

In 1908 the quantity of coal raised was 6,299,292 tons, of which 5,485,583 tons were sold, 118,499 used by workmen and 496,485 by engines. It is of interest to compare the production and sales and the amount used by collieries for the last ten years.

### Coal.

#### Production and Sales by Collieries.

|            | Production. | Sales.    | Workmen. | Engines. |
|------------|-------------|-----------|----------|----------|
| 1899 ..... | 2,642,333   | 2,419,137 | 51,903   | 124,280  |
| 1900 ..... | 3,238,245   | 2,997,546 | 52,974   | 156,108  |
| 1901 ..... | 3,625,365   | 3,119,335 | 63,865   | 214,342  |
| 1902 ..... | 4,366,839   | 3,898,626 | 61,635   | 279,014  |
| 1903 ..... | 5,255,247   | 4,621,074 | 75,503   | 393,046  |
| 1904 ..... | 5,247,135   | 4,544,609 | 80,811   | 368,398  |
| 1905 ..... | 5,050,420   | 4,475,284 | 71,303   | 355,534  |
| 1906 ..... | 5,866,605   | 5,194,590 | 84,721   | 362,746  |
| 1907 ..... | 5,730,660   | 5,046,690 | 103,873  | 414,413  |
| 1908 ..... | 6,299,282   | 5,485,583 | 118,499  | 496,485  |

The figures of the increased colliery consumption in the last ten years tell better than words can express the fact that the mines are larger, requiring more ventilation, haulage and pumping and that labor-saving machinery is more extensively employed. In 1899 five per cent. of the production was used as fuel for the colliery engines; in 1908 eight per cent. went for this purpose.

The total production of coal in Nova Scotia by counties and companies is as follows:—

#### Cape Breton—

|                                |           |           |
|--------------------------------|-----------|-----------|
| Dominion Coal Co. ....         | 3,816,958 |           |
| N. S. Steel and Coal Co. ....  | 662,350   |           |
| North Atlantic Colliery Co. .. | 58,777    |           |
| McKay Mining Co. ....          | 13,560    |           |
| Sydney Coal Co. ....           | 4,801     |           |
|                                |           | 4,556,446 |

#### Inverness—

|                                 |         |         |
|---------------------------------|---------|---------|
| Inverness Ry. and Coal Co. .... | 283,705 |         |
| Port Hood Ry. and Coal Co. .... | 99,700  |         |
| Mabou Co. ....                  | 19,250  |         |
|                                 |         | 402,635 |

#### Pictou—

|                               |         |         |
|-------------------------------|---------|---------|
| Acadia Coal Co. ....          | 413,782 |         |
| Intercolonial Coal Co. ....   | 315,590 |         |
| N. S. Steel and Coal Co. .... | 47,845  |         |
|                               |         | 777,217 |

#### Cumberland—

|                                     |         |         |
|-------------------------------------|---------|---------|
| Cumberland Ry. and Coal Co. ..      | 416,132 |         |
| Maritime Coal, Ry. & Power Co. .... | 66,969  |         |
| Minudie Coal Co. ....               | 48,397  |         |
| Stratheona Coal Co. ....            | 23,928  |         |
| Great Northern .....                | 2,726   |         |
| Atlantic Grindstone & Coal Co. .... | 861     |         |
|                                     |         | 559,013 |

#### Colechester Coal Co. ....

|  |           |
|--|-----------|
|  | 3,951     |
|  | 6,299,282 |

From the above statement it will be at once observed that the Dominion Coal Company has more than half of the output of the Province to its credit. This is greater than the previous year's product by 360,021 tons. The holdings of this company will allow a continuance of the present output for a thousand years and this is under rather than over-estimated, as it is quite impossible to make an accurate determination of the value of the submarine areas.

Eighteen thousand men found employment at the mines of Nova Scotia in 1908 and 3,000 additional men, indirectly depending on the coal industry, were engaged in railway transportation and at the shipping piers.

The great expansion of the coal industry of Nova Scotia may be judged from the fact that in the last eight years the total amount of coal sold was 36,197,653 tons. In the last ten years previous to that the total sales amounted to 20,552,526. At the same rate of increase the end of the present ten year period will see nearly two and a half times the quantity sold as in the previous decade.

The Nova Scotia Steel and Coal Company did not increase its output, though much development was done and two practically new collieries were opened that brought up the capacity of the collieries at Sydney Mines to over four thousand tons per day. Moreover, "Sydney No. 4" is now the only electrically worked colliery in the Dominion. This company is in a decidedly unique position in that it possesses collieries of its own adjoining its blast furnaces and open hearth plant for iron and steel production; at Point Edward it has its limestone quarries and at Wabana, off the Newfoundland coast, its iron mines. In the latter part of 1908 the company drove a pair of slopes or tunnels to its submarine iron ore beds and discovered a magnificent bed of ore equal in purity and greater in height than that worked on land.

The North Atlantic Collieries Company at Port Morien have entered the market this past year to some effect, having increased their output from 981 to 58,777 tons. This company possess valuable submarine areas and are working a continuation of the Blockhouse seam, noted in the past as a producer of the best gas coal.

The other companies operating in Cape Breton and Inverness Counties have all shown substantial gains in their output. The Cape Breton Coal Mining Company's colliery at New Campbellton in Victoria County has changed hands and an English lumber syndicate will hereafter operate it as a source of supply for their operations in Newfoundland. The Mabou Mines have been kept in good working condition, but no development can be recorded. In Richmond County two government drills have been at work. It is the policy of the Provincial Government to furnish a diamond or a calyx drill and keep it in repair. The prospecting company pay the expenses of its operation except where boring takes place at an extraordinary depth, when the Government may lend assistance.

The coal companies of Pictou County maintained a steady output during the year and until November there was no lack of employment.

The Cumberland Coal Company were enabled, owing to the cessation of the strike at Springhill, to increase their production by 75,093 over that of 1907. At Chignecto the Maritime Coal, Railway and Power Company have made extensive advances during the past year. A new slope has been completed to a depth of 2,400 feet and levels broken off east and west at 1,800 and 2,300 feet from which they are now getting an output. There is an up-to-date bankhead, the mine is equipped with modern machinery and the company are capable of



handling an output of 1,500 tons per day. Nearly all the other operating companies have maintained or slightly increased their previous output.

### Gold.

The gold production of Nova Scotia was less in 1908 than since 1881. The total yield was 12,000 oz. received from 59,664 tons of quartz. This yield was valued at \$237,000, an average return of \$3.96 for each ton of ore crushed. Up to September 30th, 1908, 1,974,836 tons of quartz have been crushed and the yield has been 899,887 oz. Notwithstanding it was a very dull year in production, 525 men—a larger number than in 1907—found employment in 18 different districts. The year 1909 will see greater developments, and it may be that a forward policy in respect to Government assistance to the deep gold-mining industry will be among the features of the new year to record. One-half of the total area of Nova Scotia is in gold-bearing rock. While for the past 45 years gold mining has been prosecuted with considerable success, in proportion to the outlay of labor and capital, the exploiting of this immense source of wealth has been very greatly hindered by a lack of scientific investigation and modern methods of mining. Only a limited capital was required so long as lessees were content to reap the rewards of their industry from the surface croppings. Deeper mining has yet to go beyond the early stages, though serious attempts have been made at North Brookfield by the Brookfield Mining Co. at Caribou and at Goldboro. The former mine was reopened this year past. The Baltimore-Nova Scotia Mining Company at Caribou, Halifax County, has reached a depth of 1,000 feet vertical. The largest company at work is the Boston-Richardson at Goldboro, in Guysboro County. There was crushed at the mill beneath its 950 stamps 38,600 tons of quartz. Much development work was continued and an incline shaft was run from the 400 ft. station to 700 feet and two new levels are being worked from 550 and 700 feet. This company is making good progress, warranting the large outlay of capital.

Development was also carried on at Renfrew by the Eagle Mining Company, which opened old mines, cleaned out shafts and re-timbered their property underground. The largest development, however, is to be noted at Middle River, in Victoria County, Cape Breton. There \$100,000 has been expended by the Great Bras d'Or Mining Company and they are perfectly satisfied with the result thus far secured; 28,000 tons of quartz have yielded 590 oz. of gold. They are working on an outcrop in the glen of the ravine made by the Second Gold Brook, a tributary of the Middle River. The ore contains arsenic, copper and silver, as well as gold, and there are traces of nickel. The stamping mill, crusher and every other necessary modern appliance have been erected. The mining consists in driving tunnels on the vein at the base of the hill and back stopping.

At Leipsigate, in Lunenburg County, the Micmac Company have crushed 2,692 tons and have secured a yield of 868 oz. of gold and 194 oz. of silver.

The Oldham Sterling Gold Mining Company at Oldham have reached a depth of 900 feet and have averaged during 1908 4.53 oz. per ton of quartz; 2,384 oz. have been taken out of 526 tons of quartz during the year.

At Malega Barrens, in Queen's County, the Ponhook Mining Company has cleaned out an old shaft and surface work has been carried on in preparation for greater development.

Very little has been done by the Dominion Antimony Mine at West Gore, owing to legal difficulties that have arisen.

At no other mines is there anything special to record save that the old Touquoy Mine at Moose River, Caribou, Halifax County, may, if recent rumors be correct, begin to be heard as a gold producer.

### Iron and Gypsum.

The chief reason why the rich deposits of iron ore are not mined to a greater extent than they are is that the Dominion Iron and Steel Company and the Nova Scotia Steel and Coal Company have both large beds of ore suitable for steel-making at Wabana, off the south coast of Newfoundland. Owing to the cheapness of water carriage and the accessibility of their large deposits, it does not pay to mine ore properties closer at hand. These two companies imported over 1,432,000 tons of ore in 1908. The Londonderry works have not been in steady operation owing to bad trade conditions. Development work has been carried on at Torbrook, Annapolis County, and at Arisaig in Antigonish County.

Nova Scotia deposits of gypsum are among the largest in the world and their value is becoming more widely known. Last year 230,000 tons were exported, a falling off by 100,000 tons from the export of 1907.

### Other Minerals.

Copper ores are widely spread and during late years serious attempts have been made to develop some of the more promising of them, and with very satisfactory results. The companies working at Polson's Lake in Antigonish and at Waugh's River in Colchester extended their mining operations.

The steel companies of the Province find abundant limestone in the Province to serve as a flux, and there is sufficient left to supply the world's market. Freestone and granite and other building stones were quarried in large quantities.

Twenty-three million bricks were made out of Nova Scotia clay during 1908 and many valuable clay deposits are to be found in other sections of the Province. This is specially true of a large deposit at Middle Musquodoboit, which will be developed, undoubtedly, on the construction of the Halifax and Eastern Railway Company.

The Sydney Cement Company manufactured 45,000 barrels of cement in 1908, using slag supplied by the Steel Company.

Two very valuable discoveries have been made in Nova Scotia in the last year, both of them in Halifax County. A deposit of galena carrying silver has been found on the Meagher's Grant road about two miles from the head of Musquodoboit Harbor. The interest in this discovery may be judged from the fact that over 800 areas have been taken out at the Government Mines Office.

At Moose River, near Middle Musquodoboit, tungsten has been found in the form of scheelite. The leads have been worked and are most promising. The value of this discovery is made all the greater by the present unlimited demand for this metal. The hardening of steel, the manufacture of chemical compounds and the preparation of the filament of an improved incandescent lamp are among the chief industrial purposes that call for its exploitation and have stirred up in different sections of the world an interest in its search.

Boring has been continued for coal oil near Lake Ainslie, and prospecting for tin in Lunenburg County, while the mangasese properties in New Ross in Lunenburg, in Tennecape, Hants and in Cape Breton have all been developed. Indications point to greater activity during 1909 in the mining world, and greatly increased output is looked for before the year expires.



# A VISIT TO THE MINERAL DISTRICTS OF CANADA.

Paper Read Before the Institution of Mining and Metallurgy.

By William Frecheville, Past President, and Hugh F. Marriott, Member of Council.

The Canadian Mining Institute recently organized an excursion to the mineral districts of Canada, from the Atlantic to the Pacific. An invitation was extended to the members of the Institution of Mining and Metallurgy to join the excursion, and the Council was requested to appoint two special delegates as the guests of the Canadian Institute. The Council did us the honor to appoint us as their special representatives, and we therefore had the privilege of taking part in the excursion in accordance with the hospitable invitation of our hosts. Thinking that some account of what we saw may be of interest to the members of the Institution, we submit these notes as conveying a very brief and general idea of the trip.

The party assembled in Quebec at the Chateau Frontenac, on August 24th, 1908, where we were received and warmly welcomed by Sir Lomer Gouin, Premier of the Province of Quebec, Sir George Garneau, Mayor of the city, and the Hon. C. R. Devlin, Minister of Mines for the province.

The party consisted of about forty members, and those from England included the Secretary and several members of our Institution, Mr. Walter Johnson, of the Iron and Steel Institute, Mr. John Gerrard, H.M. Inspector of Mines, Manchester, and a number of coal and iron men from the northern counties and Scotland.

Those from Germany included Professor Potonie, of the Berlin University, and Mining Councillor A. Goebel, of Arnsburg, Westphalia; whilst from the United States we had Professor H. Ries, of Cornell University, Ithaca, New York.

The representatives of the Canadian Mining Institute included Dr. Willet G. Miller, President; Mr. H. Mortimer Lamb, Secretary, and Mr. Stevenson Brown, Treasurer; Mr. Eugene Coste, Past President; Mr. R. W. Brock, Acting Director of the Geological Survey of Canada; Mr. James White, Geographer, Department of the Interior, Ottawa, and Mr. J. Obalski, Superintendent of Mines, Province of Quebec; whilst other members of the Canadian Mining Institute, who did not make the whole excursion, joined us at various points. The Hon. C. R. Devlin, Minister of Mines of the Province of Quebec, accompanied us to the asbestos mines, and the Hon. Mr. Cochrane, Minister of Mines of Ontario, went with us to Cobalt and Sudbury.

In the afternoon we were taken for a run on the St. Lawrence in a special steamer, and, among other things of interest, had an opportunity of inspecting the ruins of the railway bridge which collapsed during construction on August 30th, 1907.

In the evening we left by special train for Sydney, Nova Scotia, to see something of the coal mining and iron and steel industries, which are assuming very important proportions in that part of the Dominion.

Our investigations were facilitated by the Secretary of the Institute, who supplied us with copious and lucidly written literature on the country and works we were about to visit; we were also accompanied by prominent men of the district, who gave us all information possible on points of interest. This procedure continued throughout, and added greatly to the interest of the trip.

The literature amassed in the different provinces on the geology, mineralogy and technical details of the districts, was so great that it was not possible to do more than glance at the main points we had to see. At the same time, those who joined the train and accompanied us from place to place occupied our travelling time almost wholly in supplying and, indeed, insisting on giving us all the information at their command. In this way there are very few idle hours to look back upon.

We arrived at Sydney, Nova Scotia, and spent one day in going over works on the property of the Dominion Coal Co. We went by train to Glace Bay, 19 miles from Sydney, and were taken in charge by Mr. G. H. Duggan, General Manager, and by Mr. Charles Fergie, Mine Superintendent. Mr. Fergie was, at the time of our visit, about to relinquish his appointment, and we had the advantage of his company throughout the remainder of the excursion.

The company has an enormous area, some 144 square miles in extent, inclusive of their rights to the three-mile limit. The outcrop of the coal measures fringes the serrated edge of the easternmost section of the Canadian coast line, the general trend of the dip being seaward.

The coal seams total some 37 feet in thickness, divided among six workable seams, the larger varying between 6 feet and 10 feet in thickness. The seams form basins and channels locally, and may be said as a whole to dip to the east at an angle of 10 to 15 degrees; there are no breaks of any consequence in the formation.

The coal is bituminous and very smoky, but has only a low percentage of ash, sometimes as low as 1.75 per cent. The following analysis is from the Emery seam:—

|                       |        |
|-----------------------|--------|
| Volatile matter ..... | 31.10  |
| Ash .....             | 3.65   |
| Fixed carbon .....    | 63.10  |
| Sulphur .....         | 1.51   |
| Moisture .....        | 0.64   |
|                       | <hr/>  |
|                       | 100.00 |

The company works 12 mines, and the output is given as 4,000,000 tons per annum. In the Glace Bay basin the principal bed is known as the Phelan seam. The coal is brought to the surface by means of inclined planes from the outcrop, and by rectangular shafts sunk to strike the seams at depth.

Underground haulage is by means of compressed air locomotive engines of the following capacity: A trip of 1 to 1½ miles is made on each charge; the air is carried in the storage cylinders at a pressure of 950 pounds to the square inch; 40 tons of coal are hauled on each train, giving, say, 60 tons gross per trainload hauled. The upkeep of these engines is said to be inexpensive.

In one of the shafts a very ingenious bottom discharge skip was installed, which was automatically filled and discharged with great speed and regularity. The only attention required was the presence of a man



at the pit bottom to see that the charging hoppers were filled in the right order.

On our return from the coal property and on the way to Sydney we looked at some cement works which were in active operation.

The next day we were conducted through the works of the Dominion Iron and Steel Co., which are situated near the town of Sydney. The company own extensive piers, which receive ore and limestone direct from ocean-going steamers, and from here also is loaded the main portion of the output of steel rails for transport by water inland; 150,000 tons of crude ore and flux are received at the works every month during the shipping season. The iron ore is obtained from the company's own mines in Newfoundland, and is of medium quality.

The output from the works consists chiefly of steel rails and rods. The rails are all taken up for use on the Canadian roads, the industry being protected by a bonus on production. The coal required is derived from the Phelan seam of the adjacent Dominion Coal Co. The mixture supplied to the blast furnaces consists of 2 tons ore,  $1\frac{1}{2}$  tons coke, 1 ton limestone. The resultant metal is taken to the Bessemer converters, where silicon is blown off. It is then treated in the open hearth under producer gas for 9 to 12 hours, and the sulphur and phosphorus are burnt off. The metal is then poured and cast into ingots, after which it is ready for the rolls.

The works appeared to be very well managed, and, from their activity the company should be in a flourishing condition. Certainly nothing was lacking in the equipment which would aid to that end.

On the evening of the 27th of August the Mining Society of Nova Scotia entertained the Canadian Mining Institute and its guests at dinner at Sydney; the President, Mr. C. J. Coll, took the chair, and the Government of the Province was ably represented by Lieutenant-Governor Dr. C. Fraser, Premier G. H. Murray, and Mr. A. C. Ross, M.P.

The following day we visited the coal mines and the blast furnace plant of the Nova Scotia Steel and Coal Co. This company has six collieries in active operation, of which the output last year was estimated at 3,300 tons a day. The four blast furnaces have each a capacity of 200 tons a day, and there are three open-hearth 40-ton steel furnaces.

The output was stated as 15,000 tons of metal a month, of which 200 tons were converted into steel per day. The whole aspect of this company appeared to be that of a successful institution which had gradually increased its operations on its own merits and resources from a small undertaking to its present magnitude.

We returned to Sydney on board a fine ocean going yacht owned by Mr. James Ross, President of the Dominion Coal Co., and were entertained afterwards at a garden party by Mrs. J. K. Ross at her charming water-side residence. We left that night the easternmost point of Canada on the commencement of our long western journey.

Whilst travelling through Nova Scotia and New Brunswick we had our first opportunity of seeing the scenery so characteristic of Eastern Canada; the pine-clad hills sloping down to innumerable lakes, large and small, the abundant evidence of former glacial action in the moraine matter exposed in the railway cuttings, and the smoothly polished rock surfaces were to be observed wherever the soil has been removed.

From Sydney we made our way back to Quebec, where we stayed a day, and left the next morning for the asbestos mines of Thetford, in the special train of the Canadian Pacific Railway Co. which was to take us out to the Pacific and back. This train consisted of three sleeping cars, a dining car and a baggage car, and it is due to the Canadian Pacific Railway Co. to mention that everything connected with our transport was admirably arranged from beginning to end; in fact, we think we may say that all of us have come back much impressed by the excellent organization and management which are apparent in all this company's enterprises; we have travelled in their trains and steamers and stayed in their hotels, and can speak well of them all.

The asbestos mines of Thetford, Province of Quebec, give the impression of being highly prosperous undertakings. The best known on this side in Bell's Asbestos Co., which was formed in 1889, and is said to have been successful from the start, the dividends having ranged as high as  $22\frac{1}{2}$  per cent. in one year on a capital of £200,000. The mill is stated to have a capacity of 250 tons a day.

Adjoining Bell's Asbestos are two other important mines belonging to the Johnson Asbestos Co. and the King Brothers Asbestos Co., both working a continuation of the same deposit as Bell's; their crushing plants are stated to have a capacity of 300 tons and 625 tons per day respectively.

The three principal mines, Bell's, Johnson's, and King Brothers', are grouped about the knob of a little hill, and this small locality is said to produce about 80 per cent. of the total production of Canada, and about 70 per cent. of that of the whole world. The deposit occurs in a mass of serpentine, much squeezed and slicken-sided and intersected by a network of fissures and cracks in which the asbestos has been deposited.

The view held as to its origin is that the serpentine has been dissolved by percolating waters, and deposited in the cracks and fissures in a fibrous form, the chemical composition of the serpentine and the asbestos being identical.

It may be pointed out that several varieties of minerals are included under the term asbestos, the Canadian one being chrysotile, which is pre-eminent not only for its length of fibre, but especially for its exceedingly fine, silky and flexible nature, which renders it particularly applicable for spinning and other processes of manufacture.

The seams in the ground we saw appeared to be, on an average, about  $\frac{1}{2}$  inch wide, with fibre stretching from wall to wall. Numerous seams are smaller than this, and again quite a number wider, up to  $1\frac{1}{2}$  or 2 inches, or even more, but the impression given was that the average would be somewhere about  $\frac{1}{2}$  inch.

To give an idea of the size of the opencast workings, it may be mentioned that at King Brothers' mine it is 700 feet long by about 200 feet wide, with a depth of 165 feet. The rock is blasted out in benches and hoisted to the surface by means of a series of cable derricks working on wire ropes stretched across the working.

At and near the surface the asbestos is, as a rule, considerably changed in character, being yellowish in color and the fibre brittle, and a depth of some feet has to be attained before the fibre assumes its regular color and flexible, silky texture. The impression given was that it would be necessary to go down 10 or 15 feet to get a fair idea of the quality, and, moreover, that the industry entails the handling of such large quantities



of material that tests on a large scale from an extended area would be necessary in the case of a new mine to determine whether it was payable or not.

A valuable report on the asbestos mines and industry was written for the Dominion Department of Mines in Ottawa in 1905 by Mr. Fritz Cirkel, in which an exhaustive description of the industry is given.

In this report it is stated that the percentage of milling rock in the total rock mined varies between 30 and 60 per cent., and that the percentages of fibre extracted from the rock milled varies between 6 and 10 per cent.

We understood, however, that, owing to the increased uses and demand for asbestos, and the perfecting of the methods of extracting the fibre from the rock, poorer material is being treated, so that the lower figure given above is now probably nearer the average, and old dumps formerly thrown away are now being utilized.

The ore raised from the mine is hand-picked, the long fibre being separated by cobbing, and the rest of the material crushed and treated mechanically. A special method of treatment has been worked out of late years, and now the practice at all the mills is on very similar lines. The first crushing is done by jaw crushers; the material is then dried and further reduced by rolls or rotary crushers. It is then treated in what are called fiberizing machines, the function of which is to beat out the little lumps of fibre, so that they assume a woolly texture. After that the material passes over shaking screens, and the fibre is extracted from the upper surface by fan suction. Several grades of fibre are made, the largest being spinning fibre, the next roofing and packing fibre, and the lowest paper stock.

To give an idea of the cost of working, some figures are quoted in the report of Mr. F. Cirkel referred to above, which may be reproduced here. The mine chosen as an example is said to have been worked for years on fairly good ground. Quantity of milling material treated per day (day shift only) 80 to 90 tons, being 60 per cent. of the rock mined; production of asbestos of all grades 9.5 per cent. of the rock milled. Working costs, exclusive of management and general charges:—

|                            |         |
|----------------------------|---------|
| Per ton of rock mined..... | \$0 53  |
| Per ton of rock milled—    |         |
| Mining .....               | \$0 83  |
| Milling .....              | 0 80    |
|                            | — 1 63  |
| Per ton of asbestos—       |         |
| Mining .....               | 8 86    |
| Milling .....              | 8 55    |
|                            | — 17 41 |

Mr. Cirkel estimates that if the plant were increased so as to mill 300 tons a day, the costs would be reduced to \$14.50 per ton of asbestos.

In the same report the prices of the different grades of asbestos in 1905 are stated to vary from \$175 to \$200 per ton for the best, down to \$20 to \$25 for lowest quality (paper stock). We understood that a medium quality, with fibre  $\frac{3}{8}$  inch and under, now fetches about \$40 per ton.

From Thetford we proceeded a few miles to Black Lake station and visited a chrome iron mine, where an irregular mass of chrome iron ore occurs in the serpentine. The ore is crushed in a 10-stamp mill and concentrated on Wilfley tables; the concentrates, we are told, averaged 50 per cent. of oxide of chromium.

From Thetford we proceeded to Montreal, where a banquet was given in our honor by the Montreal branch of the Canadian Mining Institute, and the following day we were driven round Mount Royal and afterwards entertained at luncheon by the Montreal Board of Trade at the Hunt Club.

In the evening we left for Niagara Falls. Here, after seeing the natural beauties of the place, we inspected the three great power stations erected on the Canadian side. The Electrical Development Co., which was first visited, is situated above the Falls. It has the right to 125,000 h.p. This company has adopted the vertical transmission system, in which the turbines are located 136 feet below the upper water level. The power is transmitted directly upwards by vertical shafts to the dynamos at the upper ground level. There are five machines, each developing 13,000 h.p. Each machine takes up 1,200 cubic feet of water per minute.

The Ontario Power Co., whose works are situated below the Falls, has the right to 180,000 h.p. This company takes its water from the river above the former mentioned company, and leads it down to its power station by means of a piep 18 feet in diameter, which is divided on entering the works into 6 pipes, each 9 feet in diameter; 180 feet drop in level is thus obtained. Six machines are installed, each developing 12,500 h.p. The electricity is generated at 12,000 volts and stepped up to 60,000 volts for transmission.

From Niagara we returned to Toronto and, after being entertained at luncheon by representatives of the city, we visited the National Exhibition of Agricultural, Mineral, Industrial and other products of Canada. A specially interesting feature in the exhibition was the collection of mineral specimens from various parts of the Dominion.

From Toronto we proceeded to Cobalt, arriving at that camp on the morning of September the 5th. There our party was split up into several divisions which were taken charge of by a well-organized local committee; a number of the principal mines were visited, the short time at our disposal only admitting of a general idea being formed of what was going on. The local committee very kindly presented our institution with a complete set of local rocks and ores.

The geology of the district, as carefully worked out by Dr. Willett G. Miller, the Provincial Geologist, shows that the formation consists of the very ancient Keewatin Series, consisting largely of igneous rocks older even than the Laurentian granites, as they are cut through by them. Unconformably on these Keewatin rocks, basins and pockets of lower Huronian conglomerates occur in the neighborhood of Cobalt. Around, and in some cases interstratified with the Huronian beds, are intrusions (laccolites) of diabase, the contraction of which, on cooling, is supposed to have caused the cracks and fissures which led to the formation of the silver and cobalt bearing veins.

A recent writer on the geology of the district gives it as his opinion that the Huronian conglomerates correspond with the Dwyka conglomerates of South Africa, and that, like in the latter, the boulders show signs of glacial action. The scattered boulders no doubt are there, but subsequent observers, we are told, have so far failed to find evidences of glacial action on them.

The first discovery of silver ore in this district was on the La Rose vein, so called after a blacksmith in the employ of the railway company during the construc-



tion of the line. We saw the original discovery point, close to the town and near a railway cutting, where immediately below the soil, a narrow vein, rich in native silver, is seen cutting through the hard rock, which is smoothly polished by glacial action.

Before going underground we saw a rich outcrop on a cross vein called "No. 3," which was being uncovered by a longitudinal trench. Here, also, on stripping away the soil, the hard polished bed-rock underneath was seen to be cut through by a vein 6 to 8 in. wide, which, on being cleaned by rubbing, was seen in places to be half native silver.

We then went down to the 80 ft. level on the La Rose vein, where a very fine showing of rich ore was seen. The vein is narrow, rarely exceeding 8 in., and the silver is present principally in the native state, associated with cobaltite and niccolite (kupfernickel) and calc spar.

We also visited the 150 ft. level, where the vein showed a great falling off in value. The main shaft has been sunk deeper into the underlying Keewatin rocks, but we understood the vein has so far not been found to be productive in this formation. The ore is washed and hand-picked at the surface, the picked ore and the fines being sold to smelters in Canada and the United States; the rest of the material is put on the dump, pending the erection of a concentration mill.

We visited the surface equipment of the Buffalo Mine. The treatment process consisted of jaw crushers, rolls and jigs. Finer material was concentrated on Deister tables. The original ore, of value 2,000 to 3,000 oz. to the ton, was hand-picked for direct shipment, and the remainder, together with the country rock which was mined to the extent of 2 ft. on each side of the vein, was sent to the mill. This material is worth about 50 oz. silver to the ton. The vein proper, which is found up to 6 in. in width, consists chiefly of smaltite and niccolite, carrying argentite and native silver.

Coniagas Mine, adjacent to Buffalo Mine, was next visited, and the party conducted through the underground workings by Mr. Leonard, General Manager and part owner of the mine. The surface equipment on this mine followed the same principles as those at the Buffalo. Stamps were also being erected for coarse crushing.

The mine consists of two levels, the first at 75 ft. and the second at 150 ft. vertical. The lower level apparently contains more development than the upper. Some of the workings are termed "drives" and some "cross-cuts," but it appeared that the headings were carried on the veins in all directions, wherever pay ore was found. The ore in the second level was stated to be as good as that in the upper part of the mine, the matrix carrying higher values. The veins proper are calcite in a matrix of diabase and conglomerate.

The actual mineral of the veins is about 1 to 4 in. thick, in two or more stringers. The impression given of the mineral occurrence, was that of a gigantic stockwerk. The veins chiefly run S.E. and N.W. and others cross them at all angles. The Keewatin formation comes in under the conglomerates, and, when that makes its appearance, all values are cut out.

In the afternoon of the same day we visited the Lawson Mine, about two miles distant from the town of Cobalt, where work was just commencing. A trench along the outcrop disclosed, when the soil was stripped away, a rich outcrop for a considerable distance.

Near here we also visited the Crown Reserve Mine, where we saw a marvellously rich collection of hand-picked ore in the cobbing shed. We went underground

to the 80 ft. level and saw some very rich breasts of ore and understood that some \$500,000 worth of ore had been taken out of a small working down to this depth. Rich ore had recently been struck in a shaft 190 ft. distant, and interesting calculations were being made as to the probable value of the ground between the two points.

The ores of Cobalt are not only remarkable for the association of silver with cobalt and nickel, but also for their richness in native silver. At one mine we visited we were told the shipments were averaging 2500 oz. of silver per ton, and instances were mentioned of still higher values being sent from various mines. Other cases are quoted where carload lots of 30 tons have averaged 6000 to 7000 oz. and in one case as high as 38,000 oz. per ton. [The authors hardly mean this.]

Seeing the hard unaltered bed-rock cut smooth by glacial action immediately underneath the soil, with the vein running through it showing very few evidences of chemical action, brought out strongly the fact that the usual decomposed surface rock, together with the gossan of the veins, had all been planed off and carried away, and the general freshness, both of the rock and of the vein matter, suggests that the blanket of ice has not long been withdrawn. The fact that the veins generally occur in patches and basins of Huronian rocks, which are underlain at no great depth by the Keewatin series, raises the very important question as to the behaviour of the veins in passing from the Huronian into the Keewatin series.

It is recognized that, in the neighborhood of Cobalt, the veins in the Huronian beds have, so far, become impoverished on approaching the Keewatin, and are unproductive on penetrating these rocks. On the other hand, cases were given of productive veins in the Keewatin formation altogether, notably at Temiskaming. Owing, however, to lack of time, we were not able to look further into this very interesting question.

The output of the mines of Cobalt, for 1907, is estimated by the Bureau of Mines of Ontario to have had a value of \$5,900,000, and, from what we saw both of the reserves of rich ore in the older mines, and of the rich outcrops not yet developed to any great extent, there is but little doubt that the district has a period of great prosperity ahead of it.

We heard a good deal of talk of promising finds being made in new localities, but time did not admit of our going to see them, much as we should have liked to do so.

We spent a Sunday at Cobalt, and were taken a very pleasant steamer excursion to Lake Temagami, where we landed and visited a large outcrop of iron ore, consisting of a banded formation of magnetite and jasper. The ore was stated to average low in iron—only some 30 per cent.—but it was suggested that, some day, such ore might be rendered suitable for smelting by concentration, as the supplies of iron ore do not seem likely to become more plentiful as time goes on. The interesting statement was made that experience with banded iron deposits in the Lake Superior region has shown that the outcrop ore is sometimes higher in silica than the normal ore in depth proves to be.

In our trip on the lake we passed and observed with much interest an old Hudson's Bay Company's post. It appears that the old route into the northern interior used to pass along this lake up to Lake Temiskaming, the shore of which is within about four miles of Cobalt. It was pointed out that this route has been constantly travelled by white men for 200 years, and that it was not until the railway was built, about five years ago, that the



mineral riches of the locality were suspected, showing what possibilities lie in the vast little-known regions of Northern Canada.

After leaving Cobalt we proceeded to where a branch of the main line conveyed us to Moose Mountain. Here the iron mines were the point of interest. The deposit consists of big magnetite masses running through the Keewatin near the granite contact. The deposits also extended as outliers in the granite. One of these had been extensively opened out by quarry work, and was being put into shape for loading into trucks at the adjacent rail head. The outcrop extended some distance into the forest, and the deposit was evidently of considerable

(To be continued.)

## THE REPORT OF THE GERMAN DEVELOPMENT COMPANY, LIMITED.\*

### II.

1908.

#### Report on Mining Claims in the Montreal River Mining Division by Alfred E. Barlow, M.A., D.Sc.—

From the tone of Dr. Barlow's references to the Montreal River district, it is evident that he is deeply impressed with its importance and is most sanguine as to its future. In his report for 1908 he urges the construction of the branch railway line from Charlton, through Elk City, to Gowganda Lake on the east branch of the Montreal River. He notes the improvement that was made in river transportation during last season, but indicates that, in his opinion, there is peremptory need for rail communication.

The rush to the Miller Lake and Gowganda areas began early in July. A gasoline launch carried passengers from Elk Lake to the east end of the Long Portage, a distance of about twelve miles. Here the canoe route to Bloom, Everett, Miller and Gowganda lakes begins. A portage of two miles brings the traveller to Stoney Creek. Portage, Birch and Pike lakes are passed and the outlet of Bloom Lake is reached. The last named lake is one of a chain in which Wigwam, Lost and Calcite lakes are links. From the beginning of the portage to Bloom Lake the whole distance is about fifteen miles.

Further details concerning the summer and winter routes are followed by description of mining locations and work performed. Incidentally, Dr. Barlow commends the action of the Provincial Government in removing the Mining Recorder's office from Latchford to Smyth.

The geology of the Miller and Everett Lake Mining District, Dr. Barlow states, is almost identical with that of the region surrounding Cobalt. East of Miller Lake, Keewatin is largely represented with smaller masses of intruded (newer) diabase.

To the north the newer diabase contains small included areas of Keewatin, made up, as usual, of different varieties of green schists and altered diabases. The Lower Huronian is composed of slate, conglomerate, and quartzite, in ascending order.

All of the ore bodies occur in the form of veins cutting chiefly the quartz diabase; but, also cutting the

magnetite. The mining company was said to have a contract with the railway company for the carriage of up to 500,000 tons of ore a year to Key Harbor, in Georgian Bay, a distance of 81 miles, for 65¢ a ton. The grade of the ore is: Iron, 54 per cent.; silica, 12 per cent.

Leaving Moose Mountain, we looked at a small gold placer outfit on the Vermilion River. The material treated had the appearance of secondary deposition as moraine matter, and covered the surface of the country round the river banks. It consisted of granite and diabase pebbles lying loosely among earth and sand. Some small stuff, roughly panned, showed gold, but no work was going on at the time of our visit.

quartzite, conglomerate and the green schists and diabases of the Keewatin formation.

While there is no indication of systematic arrangement of the fissuring, some of the more important veins have a north and south direction. The veins vary greatly in width and in vertical and horizontal extension. Those from 2 to 6 inches wide are most common and are apt to be richest. The gangue minerals are chiefly calcite and quartz, the former being by far the more abundant. The so-called "aplite" dikes, cutting the diabase, show a fine to moderately coarse-grained feldspathic material varying in color from pale pink to deep flesh red. "These dikes are in reality a 'diabase pegmatite' having the same genetic relationship to diabase that ordinary pegmatite has to granite. Chalcopyrite is perhaps the most usual and abundant of the metallic constituents, but pyrite, hematite, smaltite, and niccolite, with blooms usually accompanying these two last mentioned minerals, are also very common. So far (late in 1908) no vein with visible silver has been found on claims belonging to this company." To the west and southwest, however, rich silver veins were found on other claims, and northwest, on the Long claim, an aplite dike 12 inches wide showed abundant silver.

Dr. Barlow's report concludes with an expression of high hopes in the ultimate discovery of silver in quantity.

1907.

#### Report on Bighorn, Brazeau and Saskatchewan Coal Lands by D. B. Dowling.

In 1907, Mr. D. B. Dowling, whose work in the western coalfields has attracted much attention during the past few years, chose for the German Development Company three locations. These, Mr. Dowling asserts, are the best in Northern Alberta. They are all on the eastern flank of the Rocky Mountains. The lands were purchased from the Dominion Government.

The Brazeau location is within 65 miles of the projected G. T. P. Railway line, through the Yellow Head Pass. It is 115 miles west from the Calgary and Edmonton road and about 80 miles north from the C.P.R. station at Laggan. The property is four miles long and one mile wide.

\*See Editorial in issue of Jan. 1, 1909.



Sixteen miles to the southeast lies the Bighorn area on a branch of the Saskatchewan River. It contains five square miles.

The Saskatchewan location (320 acres) on the south side of the stream is three miles distant from the Bighorn property.

Although in the mountains southward for 100 miles the coal is semi-anthracite, the coal found in these areas is all bituminous and makes good steam coal. Unlike the Canmore coal, it can be coked.

The three fields are situated on one continuous series of rocks, forming a continuous band about 2,000 feet thick from the Saskatchewan northward to near the main part of the Brazeau River. They lie against the tilted limestones that form here the Bighorn Range. The beds dip from 30 to 40 degrees from the horizontal toward the south-west, and they can be traced almost continuously. Although there is, no doubt, coal in this strip at any portion, still the topography of the country limits the field to such areas as can be approached by railway.

The choice of areas was strongly influenced by considerations bearing on transportation. Mr. Dowling chose for purchase in the three localities such areas as would, as far as possible, cover the portions on which the coal could be attacked cheaply from the surface, leaving for outsiders the portions that would entail great expense for operating.

Most of the coal lands produce only a lignite coal varying in grade from very poor quality in Manitoba to a fair domestic fuel near the mountains. These coals are very light when partly burned and their use on railway engines is prohibited as they start forest and prairie fires.

The lowest horizon is the richest and best, and is brought to the surface only in the folded and faulted country close to the Rocky Mountains. These areas are limited. Their coal content is remarkably uniform. As a rule, less coal is to be found toward the east. In a north and south direction the coal content is fairly constant. Thus at Coleman there is a total of 125 feet coal. On the main line C. P. R. the measures have about 100 feet of coal. Half way north to the Saskatchewan there is 115 feet. So that when 70 feet of coal is found at the Brazeau, there should be no loss of coal in the short distance south to the Saskatchewan River.

The conclusions drawn by Dr. Milton L. Hersey, Montreal, from analyses conducted in his laboratories, are included in Mr. Dowling's report.

Dr. Hersey points out that the very low percentage of sulphur found in the samples submitted to him, indicates that the coke obtained from these coals will be particularly suited to the smelting of iron ores. Nova Scotian coals average about 13,500 B. T. U. Some of the best samples from Big Horn River yielded 14,000 B. T. U. Two samples yielded from 10,000 to 11,000 B. T. U. per lb., which proved them to represent saleable fuels. The rest yielded from 12,000 to over 14,000 B. T. U. All coked except one.

Comparing the samples under consideration with many of the western and eastern fuels that had been analyzed in his laboratories, Dr. Hersey states that the average volatile combustible matter in coals from the Canmore district is 16 per cent.; from Nova Scotian coals, about 35 per cent.; from the above mentioned samples, about 25 per cent. Fixed carbon in the Canadian coals averages about 74 per cent.; in Nova

Scotian coals, 55 per cent.; in the samples analyzed, about 63 per cent.

The ash reported ranges from 27.02 per cent. to 4.60 per cent. Most of the samples are well under 10 per cent. The larger seams are all of low ash content. The high figure quoted above is from a sample of a dirty seam.

A rough approximation using 60 feet for maximum thickness gives 56 million tons per square or a total of 224 million tons of excellent steam coal for the four mile Brazeau area.

On the Bighorn River area, on which is a natural water-power, three seams were measured, two of 4 feet each and the lowest 6 feet. The top seam was high in ash, the lower two were fine bituminous coal yielding a firm, strong coke. A rough estimate gives a total of 10 million tons per square mile for the three seams together. This does not take into account other known seams nor seams as yet undiscovered.

The Saskatchewan River location offers, Mr. Dowling asserts, "the best example I can show of a small area commanding the approach to all the adjacent coal seams."

Mr. Dowling's estimate for tonnage, as far as the three districts have been prospected, shows a total of about 279 million tons.

Notes on the demand for the coal, on competing mines, a table of distances from mines to Edmonton, Calgary, and Innisfail, and a few general notes conclude this section of Mr. Dowling's well-constructed and most interesting report. A diagram, in which the coals from the company's lands are compared with other Canadian and United States coals, is appended.

In our next issue we shall summarize Mr. Dowling's description of the Kananaskis coal area, and Mr. James McEvoy's report on the same lands.

## CARBONS (BLACK DIAMONDS) FOR DIAMOND DRILLS.

By Jacques Baszanger.

Carbonado, or black diamond, is one of the hardest substances known, being sometimes harder than the crystallized diamond. It is, however, unsuitable for cutting into gems, because of its opacity, and its being amorphous. Carbonado was first successfully used by the French engineer, Lechat, in the drills for boring holes for blasting in the St. Gothard tunnel. At present, carbonado is largely employed in diamond drilling, in connection with which it is one of the principal items of cost.

Carbonado is obtained in the Province of Bahia, Brazil, in La Chapada and Lavras districts, where it is mined from stream beds and other alluvion. The miners sell their find to agents of exporting firms in the city of Bahia.

Some very large stones have been found, among others, one of 1,100 karats about 25 years ago; also one of 1,700 karats, and in 1895 a gigantic stone of 3,078 karats or 615 grams, which was purchased as well as broken up by me personally into pieces of suitable size for diamond drills, a special machine being devised for the purpose. This stone was purchased for \$32,000 at the present time it would be worth \$261,630. Several stones of 400 to 800 karats have been discovered during the last ten years, and stones of 100 to 200 karats are frequently found.



Previous to 1870, carbonado was practically valueless. From 1870 to 1872 it was employed as an abrasive for cutting and polishing the white gems and thousands of karats were sold at 50 cents per karat, to be crushed into powder for this purpose. A few years later, when carbonado was employed in diamond drilling, it sold at \$2 to \$4 per karat, and then rose gradually to \$10 per karat, at which price it remained until 1895, after which it advanced by leaps and bounds to \$50 per karat. The price fell back to \$25 per karat, but rose again to \$85 per karat, at which figure it now stands; from present indications, a further advance is expected. The situation is due to the decline in the supply of

carbonado during the last ten years, while the demand has increased. When diamond drilling is resumed more extensively on the Rand, it is expected that it will be even more difficult to supply the demand for carbonado.

Bearing upon this subject of diamond consumption in drilling, it is interesting to remark that in putting down the drill hole at Rybnik (Paruschowitz), Upper Silesia, which attained a depth of nearly 7,000 feet, upward of \$25,000 worth of carbon was consumed. The carbon settings for a drill-bit are expensive. Bits as large as 1 foot in diameter, set with \$5,000 to \$8,000 worth of carbon, are frequently employed in Europe.

## REPORT ON THE MINING AND METALLURGICAL INDUSTRIES OF CANADA, 1907-8.

Issued by the Mines Branch, Department of Mines of Canada.

### A REVIEW.

To compile a directory of the mining and metallurgical enterprises of Canada is what the Mines Branch, under the direction of Dr. Eugene Haanel, set out to do early in 1907.

A special staff of investigators was appointed to collect data in the respective provinces, the members of which were assigned thus:

Yukon Territory—D. D. Cairnes.

British Columbia, Alberta, Saskatchewan and Manitoba.—R. R. Hedley.

Ontario.—Fritz Cirkel and J. J. Bell.

Quebec.—J. W. Bell.

Nova Scotia and New Brunswick.—W. F. Jennison

Definite instructions were given that only producing mines, or mines that were about to make shipment, and metallurgical plants in active operation, were to be reported upon. It was further understood that all information was to be secured at first hand by means of personal interviews and visits.

In addition to the material collected by the above-mentioned staff, several members of the Geological Survey, including Director R. W. Brock, contributed descriptions of special sections. Dr. Haanel in his introductory note refers in most appreciative terms to the manner in which Mr. S. Groves, editor of all the Department's publications, arranged, revised and edited the bewildering mass of material submitted to him.

The Report contains 936 pages of text, wherein are described or mentioned practically all the operating metallic and non-metallic mineral mines of the Dominion; and the metallurgical, clay, and building stone industries. Mineral maps of all the provinces, along with 144 half-tones and diagrams embellish the volume.

Historical notices of the more important branches of the industries in each province are given.

The capitalization and personnel of each organization or company is also mentioned. In the index, about 1,500 names of owners or companies are recorded.

Wherever practicable, details of construction, methods, and costs have been included.

### Part I. Yukon Territory.

In this section, an historical sketch is followed by a short discussion of the methods of placer mining including an extract from a paper by Mr. J. B. Tyrrell, and a note on lode mining.



DR. EUGENE HAANEL, Director Mines Branch, Department of Mines, Ottawa.

We note that, in June, 1908, there were 58 dredging leases, comprising 304 miles of submerged beds of rivers in the Yukon Territory. Twelve large dredges (3,000 cubic yards capacity each) were then in commis-



sion and more were added to the list before the season closed. At Whitehorse a considerable number of copper mines were being worked. At Tantalus and at Sourdough, coal, retailing at from \$15 to \$18 per ton, was being produced.

The equipment, properties, and personnel of the dredging, hydraulicking, and other companies are then detailed. In each case the names of members of the directorate, or of owners, the share capitalization, place of registration, and the country under whose laws the company is incorporated, are mentioned.

Half-tones and an excellent mineral map illustrate the text.

#### British Columbia.

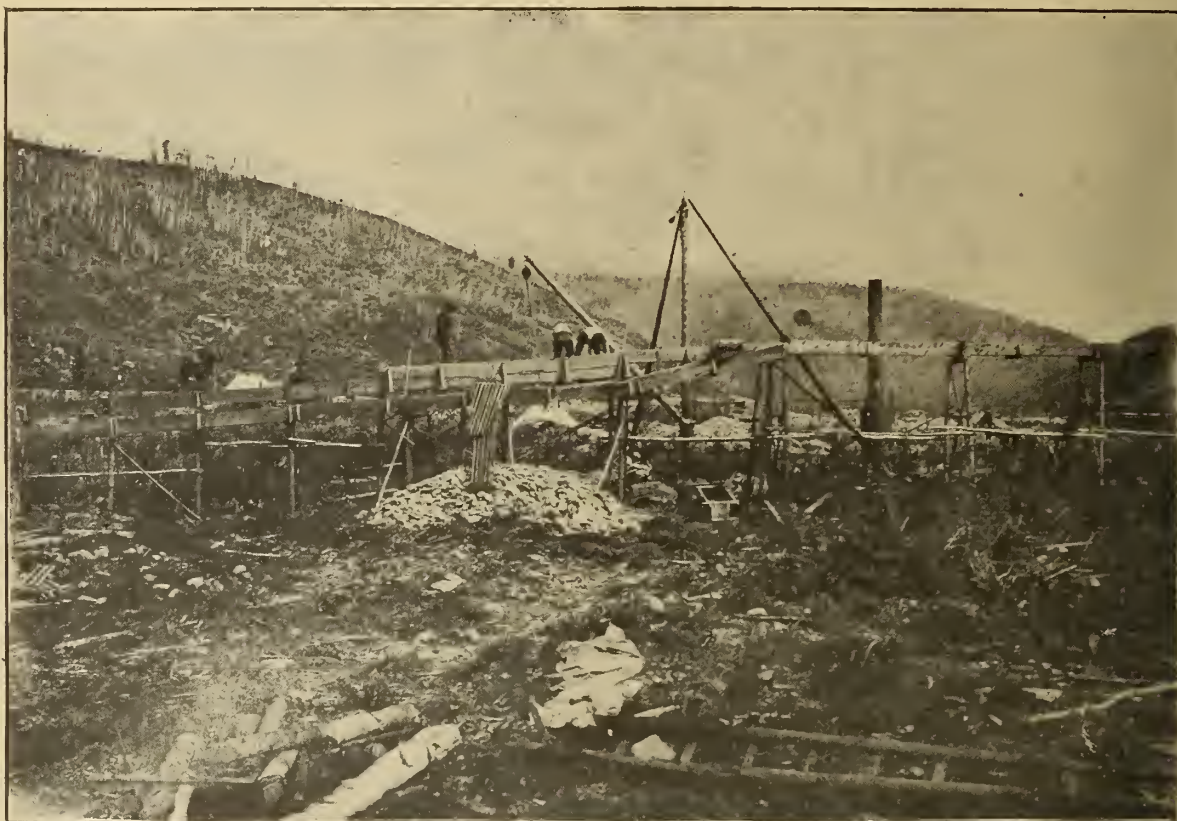
This westernmost province receives its full share of attention. About 200 pages are taken up with its various mining activities. Preliminary notes on placer mining, lode mining, coal, coke, recent development and

a bid for a share of the increasing demand for mining machinery.

Southeastern British Columbia has been prominently brought before the public for some years. The notice given in the report to Atlin and other northerly sections will aid in advertising these undeveloped countries.

#### Alberta.

The coal of Alberta, at present its chief mineral resource, occupies most of the space devoted to this province, although both natural gas and gold receive mention. "In some parts of Alberta almost every rancher is the proprietor of a coal mine; which fact renders the task of securing or compiling accurate statistical data . . . a matter of unusual difficulty." So, also, it indicates the tremendous extent of Alberta's coal deposits, which, when the projected trans-continental railways shall have been developed, will undoubtedly



"Clean Up," Hunker Creek, Y.T.

progress, labor conditions, are followed by ample data concerning the companies engaged in mining gold, gold-copper, copper, silver-lead, zinc, and iron. Power development on the Kootenay and Kettle rivers, a full descriptive list of smelters, and an adequate section on operating coal mines, complete this division.

The full information provided as to the nature and extent of corporate enterprises, particularly of such concerns as the Consolidated Mining and Smelting Co., the British Columbia Copper Co., the Granby, etc., and of the mines, large and small, will prove particularly advantageous to eastern manufacturers. British Columbia is not yet a large manufacturing province. Most of the machinery brought into the province is manufactured elsewhere, in Canada, Great Britain, or the United States. The list of possible customers given here will unquestionably encourage manufacturers to make

contribute largely to the coal production of Canada.

The list of operating companies and the facts concerning analyses, etc., are most impressive. The large land holdings of many of the companies promises well for their development.

Concerning natural gas there is a brief note by Mr. Eugene Coste. It is appropriate to mention here that just as this review is being written, news has come that the C.P.R., under the direction of Mr. Coste, has struck an enormous flow of gas at Bow Island.

#### Saskatchewan.

Three coal-mining companies are listed for this province.

#### Ontario.

This section opens with an historical and statistical outline by Mr. H. Mortimer Lamb. Then follow classi-





Automatic Dumping, Gold-Run Creek, Y.T.



Laurentian Gold Mine—100 Miles East of Kenora, Ont.



fied list of operating mining and smelting companies. Included in these is a 9-page description of the Canadian Copper Company's plant. Iron, copper and nickel, gold, silver, zinc, lead, iron pyrites, graphite, mica, talc, corundum, salt, peat, petroleum, oil and natural gas are dealt with.

We note the omission of mention of feldspar mining. This is an oversight that should be rectified. About 140 pages are given to Ontario. The text will require large additions in the next edition of the volume particularly in view of the expansion of mining activities at and about Cobalt.

#### Quebec.

The pages that deal with the asbestos industry are the most valuable of this section. It comprises a brief historical and statistical summary, a short article upon the geology and uses of asbestos, along with the usual list of companies, etc.

#### Nova Scotia.

This province comes next, the order from west to east being broken by placing the chapter on Nova Scotia ahead of that on New Brunswick. The arrangement of subjects in this chapter is slightly heterogeneous. Historical notes on coal mining are succeed-

ed by these subjects: antimony, gold, iron and steel, coal, statistical review. The information concerning gold mining is well selected, displaying costs, methods, wage rates, etc. The Dominion Iron & Steel Company's plant is well described. So also are the other iron and steel plants.

cial stone, limestone, cement, plaster, pottery, ochre, gypsum and such industries, are written up in the same way as are the general mining and metallurgical industries in Part I.

Wherever practicable the capacity and equipment in all cases of the brick and tile plants are specified. The list of these and kindred plants is impressive.

#### General Remarks.

In outlining any company's operations the method followed is roughly thus:

Name.  
Date of Incorporation.  
Details of Capitalization.  
Locality.  
President and Directors.  
Superintendent.  
Place of Registration.  
Head Office.  
Number of men employed.

The space assigned to one enterprise is more or less commensurate with its importance.



Michel Colliery, Michel: Crow's Nest Pass Coal Co., Fernie, B.C.

In the matter setting forth the holdings and equipment of the Dominion Coal Company there is included the text of the agreement signed in 1904 by the Dominion Coal Company and the Provincial Workmen's Association. This, we think, is hardly needed. Indeed, it is obviously out of place.

#### New Brunswick.

The Imperial Coal Company and the Canadian Antimony Company are the only concerns touched upon. The province's coal, manganese, iron, copper and antimony resources are noted briefly. A complete statistical review of Nova Scotia's mineral production concludes Part I.

#### Part II. Structural Materials.

Taken up in order, from west to east, the brick, tile, sand-lime brick, sewer pipe, building stone, artifi-

It must be borne in mind that this is a first attempt. As the work goes through its annual editions, improvements and changes in matter and form will of course be made. Meanwhile, it is not out of place to offer a few criticisms and suggestions.

The first impression that one receives is that the book is of unweildy bulk. As it contains well nigh 1,000 pages and many maps and diagrams, this is to be expected. But the fact that it is difficult to handle suggests dividing it into two volumes. This could be easily done by binding separately Part I. and Part II.

Another suggestion is that the matter of permanent interest, such as the remarks about the geology, etc., of the districts of each province, be thrown together in the front of the volume, and that the lists of companies, etc., which will have to be changed and added to each year, be printed in smaller type and placed at the back of the volume. Some such arrangement as this would reduce the size of the book and would facilitate changes.

One suggestion more and we shall close. For the benefit of readers a satisfactory bibliography should be appended to each chapter.



## ONTARIO BUREAU OF MINES IN 1908.

Written for the Canadian Mining Journal by  
T. W. Gibson.

The Act of the Legislature which created the Bureau of Mines defined its object to be to "aid in promoting the mining industry of the Province." Just how that aid was to be given was left entirely to those responsible for the Bureau's management. It can fairly be said after seventeen years that the Bureau has justified its existence. It has shown its usefulness in many ways and sometimes in signal fashion. Doubtless its principal function is to furnish information—statistical, geological and mineralogical. Such information must be both timely and reliable.

Hitherto the Bureau has acted upon the belief that a post mortem examination, say, of a mineral district, with nicely worked out and critical details, is of less importance than a preview, even if bold or rough in outline, which will be of practical benefit to those actually engaged in exploiting such a field, or in establishing a new industry. The treatment of the Cobalt silver camp illustrates the working of this principle. It was the Bureau that first acquainted the public with the wonderfully rich discoveries of silver at Cobalt; the fact is that some of the original discoverers themselves did not know they had found silver, until Professor Miller, the Provincial Geologist, apprized them of the truth. This was just before the snow fell in the winter of 1903, and early next spring the Bureau's geologists and surveyors were in the field working out the geology and ore relationships, a task which they accomplished in such a way that the classifications and conclusions reached in a season's examination have stood ever since practically unchallenged, and prospectors went into the field in the spring of 1905 with a geological map and report of the greatest practical use to them in their labors.

During 1908 the attention of the Bureau was directed largely to outlining extensions of the silver-bearing field and defining new ones. In the unsurveyed territory south of the Township of Lorraine, now generally called "South Lorraine," the geology, which is largely similar to that of the Cobalt proper, has been worked out in sufficient detail to enable a map of the district to be prepared, which with a brief report on the field will be published next spring. The Montreal River district, especially the Miller and Everett lakes region, and the Gowganda country, has been treated in similar fashion, and will likewise be the subject of a geological map and report. Mr. A. G. Burrows has had charge of this work, assisted by Mr. R. B. Stewart.

The Gillies limit, which two or three years ago loomed up large in the excited atmosphere then prevailing, has also been subjected under the direction of Mr. James Bartlett to close examination, not confined to the portion known to carry silver-bearing veins, but extending over a great part of the hundred square miles of which the limit is composed.

But silver is not the only metal that the pre-Cambrian rocks of Northern Ontario contain. Iron is even more important than silver, and for several years Dr. A. P. Coleman and Mr. E. S. Moore have been investigating the extensive iron ranges which run easterly from the east shore of Lake Nepigon. On these banded ranges not many bodies of workable ore have yet been found, but there is ground for hope that closer and deeper probing by means of the diamond drill may show that as in the United States Lake Superior fields the

banded ore on the surface is occasionally underlaid by higher grade material at depth.

The iron and steel industry is of prime importance to the country, and was dealt with at length in the Bureau's Seventeenth Report, in which Mr. George C. Mackenzie not only described the condition of the industry in the province, but made a valuable contribution to the information bearing on the concentration of low-grade ores by magnetic processes. Mr. Mackenzie is continuing during the present winter his experimental work on the sulphurous and silicious ores of Eastern and Northern Ontario with a view to determining the best methods of fitting them for utilization in the blast furnace.

It must not be supposed that Northern Ontario contains all the minerals of value in the Province. The fact is that the stratified limestones of the southwestern peninsula carry much wealth in the form of petroleum, natural gas and salt, to say nothing of stone for construction purposes and lime, or of the deposits of brick clay and cement marl which overlie them. The petroleum fields of Tilbury East and Romney, described by the Bureau in a recent report, have given a new lease of life to the oil production of Ontario, and the gas strikes of Haldimand and Kent Counties have brought the advantages of this ideal fuel within the reach of hundreds of thousands of people in this most thickly settled and oldest portion of the province. One result of the work of Mr. G. R. Mickle, mine assessor, has been to put a stop to the criminal waste of natural gas which was going on in these gas fields. However, large a supply of natural gas there may be in any locality, it is strictly limited in quantity, and when it is gone there is an end of it. Anything that will tend to prolong the supply is a public benefit.

In addition to exploring and making known mineral resources of the province, the Bureau of Mines is charged with the duty of enforcing the regulations provided by the Legislature for the protection of workmen in operating mines. There has recently been a serious epidemic of accidents in the mines of Cobalt. The chief classes of accidents have been due to explosions and to falling of men from buckets. When analyzed, it is found that the number of openings and the large quantity of shaft sinking that is done have a direct bearing upon the frequency of these accidents. Explosives of the gelignite class seem to be proving themselves dangerous in the severe weather in winter. Hoisting men in buckets is forbidden by the law, but miners dodge the ladderways and persist in taking the easier but more dangerous route to the surface, via the bucket. Frequent warnings proving unsuccessful in stopping such practices, prosecution of offenders has been begun. It is sincerely to be hoped that mine owners and miners will combine to eliminate all unnecessary risks from the business of mining, which at the best is more or less hazardous.

## THE PROGRESS OF THE ELECTROMETALLURGY OF IRON AND STEEL.

Written for the Canadian Mining Journal by Dr. A. Stansfield, McGill University.

In reviewing the progress of electrometallurgy during the past year one is struck more by the steady improvement in certain branches than by any very startling inventions. The application of electrically generated heat to the production of iron and steel is one of the



most recent, and is becoming one of the most important branches of electrometallurgy, and it is here that improvement in design and increase in the size of furnaces is most marked.

The most successful application of the method of electrical heating to the metallurgy of iron and steel has been in the production of high grade steel, in the electric furnace, either by melting pure materials as in the manufacture of crucible steel, or by melting and refining steel scrap, pig iron, etc., as in the open hearth process. Two types of electrical furnace have been employed, the Heroult furnace and the induction furnace. The Heroult furnace is provided with two vertical carbon electrodes and the heating is mainly affected by electric arcs between these electrodes and the surface of the molten material in the furnace, while in the induction furnace the steel is contained in a ring-shaped trough forming the short-circuited secondary winding of a transformer, and is heated by the electric current which is induced in it. The Heroult furnace resembles the open-hearth furnace in shape and the molten steel which it contains can be readily and completely refined by additions of iron ore, lime, etc., to the slag floating on its surface. The induction furnace with its narrow trough does not lend itself so readily to the refining process, and its use has been restricted mainly to melting pure materials as in the production of crucible steel.

The Kjellin, Colby and other of the original types of induction furnace consisted of a rectangular iron core with a primary winding connected to the electrical supply, and a secondary, which consisted of a circular trough containing the metal to be melted. The primary and secondary were sometimes on the same limb of the core, and at other times on opposite limbs. A combination of these arrangements consists in placing a primary and a secondary on both of the vertical limbs of the core, the secondaries meeting in the middle of the furnace, thus forming a figure 8. The Roechling Rodenhauser furnace is developed from this by enlarging the central part of the channel, and by providing an auxiliary supply of heat for this part of the furnace, which would be insufficiently heated by the current flowing through the narrow secondary circuits. The auxiliary supply of heat is obtained by means of metal electrodes, which are connected to secondary windings of one or two turns on each of the vertical limbs of the core. These electrodes do not enter the molten metal in the furnace, but are separated from it by a thickness of magnesite bricks which form the lining of the furnace. These bricks are non-conductors of electricity when cold, but at the temperature of the steel furnace they conduct sufficiently well to convey the auxiliary heating current from the electrodes to the molten metal. This construction provides a central space in which the refining of the molten steel can be effected, and it also increases the capacity of the furnace without the serious lowering of power factor that attends an increase in size in the simple form of induction furnace.

The furnace described above is operated by single phase current, but by using a core having three limbs, three phase current can be used and the furnace is then more readily adapted to the ordinary conditions of electrical supply. The three-phase furnace has the incidental advantage of producing a circulation of the molten steel, thus insuring a uniform composition.

These furnaces are largely used for finishing steel that has been made in the Bessemer converter or open-hearth furnace. Such steel has had the greater part of the impurities removed and the duty of the electric furnace is to eliminate the final traces of phosphorus and

sulphur, to remove the whole of the dissolved oxide of iron and, finally, to adjust the composition to that required in the finished steel. For work of this class induction furnaces of about 1,000 h.p. require a power of about 90 k.w. per ton of capacity and consume about 150 to 200 k.w. hours per ton of output.

Compared with the open-hearth furnace, the electric steel furnace has the great advantage of being able to remove completely the oxide of iron and dissolved gases, thus getting a sound steel. The phosphorus can be eliminated very perfectly by repeated washing with fresh basic slags, which are then removed, thus enabling the steel to be deoxidized in the furnace without throwing back the phosphorus into the steel. In the basic open-hearth furnace great difficulty is experienced in removing sulphur at all completely because its removal in the presence of iron oxide is scarcely possible. In the electric furnace the phosphorus is first removed, the steel is then deoxidized and the sulphur eliminated as calcium sulphide by reactions similar to those employed in the blast-furnace. The Roechling-Rodenhauer induction furnace are used at the Roechling works in Voelklingen, Germany, and more than 1,000 tons of steel rails had been made in their three-phase furnaces and sold to the German Government before last August.

The Heroult steel furnace is in use in a number of steel plants, mainly for finishing steel that has been made in the basic open-hearth or other steel furnace. They are usually made with a capacity of from 1 to 5 tons. The Girod furnace resembles the Heroult furnace, but it has in addition to the carbon electrodes a number of iron electrodes embedded in the hearth of the furnace. The carbon electrodes in this furnace form one pole, while the iron electrodes form the other pole of the furnace.

A furnace devised by Professor B. Igëwsky, of Kieff, Russia, depends entirely, as the Roechling-Rodenhauer furnace does in part, on the conductivity of heated bricks. The furnace is a rotating drum of firebrick, having thin iron plates laid between the courses of bricks and connected to the sections of a commutator in such a way that an electric current is caused to flow part way around the drum. In this manner the drum and the contained steel or iron is heated and melted. This furnace is only in the experimental stage.

The Lash process for making steel in the open-hearth or electric furnace is intermediary in its action between the ordinary open-hearth process in which pig iron is refined by the action of iron ore from which a certain amount of iron is incidentally reduced by the action of the metalloids in the pig iron, and the electric process for the smelting of iron ores in which carbon is the reducing agent. In the Lash process, iron ore, carbon and shotted pig iron are heated together in some form of furnace such as the Heroult Steel furnace, yielding ultimately steel of good quality. The process will require less electrical energy than the direct reduction process in proportion as more pig iron is used in the charge, but no doubt the pig iron has a physical as well as a chemical use in facilitating the heating and reduction of the ore mixture. In a recent paper by Mr. F. A. J. Fitzgerald it is stated that 50 tons of steel have been made by the Lash process in a Heroult electric furnace at Niagara, 60 per cent. of the charge being iron ore, 23 per cent. cast iron (in the form of borings or shotted pig iron) and the balance being fluxes and carbon. The energy consumption was about one-quarter h.p. year per ton of steel.

With regard to the processes for the direct reduction of iron from the ore in an electric furnace yielding pig



iron or steel, there appears to be nothing to report. Last April a new experimental furnace at Heroult-on-the-Pitt was reported as having been running continuously for several days, turning out over a ton of pig iron per day, but an absence of further reports may be taken to indicate that difficulties have been encountered and have not yet been overcome. The Stassano steel furnace, originally intended for the production of steel direct from the ore is now used for making steel from pig and scrap; a furnace of 1,000 h.p. consuming some 1,000 h.p. hours per ton of steel made from the cold charge.

### BOOK REVIEWS.

**The Commercial Handbook of Canada, 1909, Fifth Year; Heaton's Annual.** Edited by Ernest Heaton, B.A., (Oxon.) Barrister-at-Law, and J. Beverley Robinson. Price, \$1.00. Published in December by Heaton's Agency, 28 Wellington St. East, Toronto.

The Commercial Handbook is designed to present concisely all information that any man of affairs needs in the course of his daily routine. As a directory it contains the names of all Government officials, members of legislatures, postal information, transportation, banking, legal, and other directories, along with customs regulations, etc.

The second part is a digest of the latest official reports of all the industrial activities. A few pages are given to a list of operating mining companies, etc. The "Boards of Trade Register," revised to date, contains a succinct description of every noteworthy town in Canada. In many cases the opportunities offering for manufacturers and investors are noted.

A number of exchange and miscellaneous tables are appended.

A most useful cipher code appears on pages 60 and 61.

Heaton's Commercial Handbook should be of immense value to all mine managers.

**Quarterly Bulletin of the Canadian Mining Institute. Souvenir Number. Summer Excursion.** Edited by the Secretary.

Well nigh 300 pages of narrative, not to mention another hundred pages of miscellaneous matter, including a bibliography of Geological Survey publications relating to the mining districts visited during last summer's excursion, this is the material that goes to make up the latest bulletin of the Institute.

The story of the journey through Canada from coast to coast is attractively told. The Secretary displays a sense of proportion and not a little literary discrimination. At no point does one become weary in reading of the doings of that noble band of excursionists.

At judicious intervals the reader's interest is sharpened by humorous incidents. It is worthy of remark that, staid and respectable as are the members of the Canadian Mining Institute and their guests, there is a noticeable brightening of the atmosphere during the western itinerary. The misogynist might attribute this to the absence of ladies on this part of the journey; but we have no wish to do more than state the fact.

The tragedy that was enacted at Calgary is touched upon deftly. There is, however, a notable hiatus in the Secretary's official account of this soul-stirring event. He omits mention of his own tactical response to the steer's hostile demonstration. This oversight is partly redeemed by a carefully compiled table of casualties.

One of the happiest occasions that marked the peregrinations of the pilgrims was the dinner organized by the effervescent Treasurer on the last night of the journey. If for no other reason, this dinner will be remembered for all time as having brought from Mr. Obalski a weighty pronouncement on the melon industry of Quebec; and a similarly important utterance from Mr. Davies-Evans on the possibilities of gem propagation in Ontario.

Of what happened at Nelson, at Granby, at Glace Bay, we shall leave the reader to learn for himself.

Mr. Lamb has done his work well.

### EXCHANGES.

**Mining and Scientific Press, Jan. 16, 1909.** A discussion held by the Pacific Coast division of the Mining & Metallurgical Society on Nov. 21st, 1908, is reported in this number of our contemporary. The subject of debate was the protection of investors. Many good points were brought out. For instance, one speaker told of the objections that certain directors had to publishing the working costs. It was feared that if the miners knew how cheaply the ore was mined they would assume that the company could pay them more wages.

Another speaker claimed that since a mining engineer is obliged to render to his directors an estimate of ore reserves and cost-sheets, so, in turn, should the directors render to all stockholders a similar report.

**The Mining World, Jan. 23rd, 1909.** An editorial on the "Prospector and the Blowpipe," in this issue of our contemporary, is well worthy of quotation. "In some things," says the Mining World, "a little knowledge may be dangerous, but in others it may mean a fortune. The prospector need not have a scientific or technical education to be fairly successful, but he will find it to his advantage to have a working knowledge at least of chemical analysis by means of the blowpipe as by its aid he will often be able, after a few minutes' work, to determine whether or not a mineral contains anything of especial value. . . . The procedure is simple and easily acquired after a little study and practice. . . . Blowpipe tests do not replace the chemical analysis or assay, but is rather preliminary to it."

### PERSONAL AND GENERAL.

Mr. J. B. Woodworth has returned from a trip to Miller Lake.

Mr. Herbert Salinger, who represents Beer, Sondheimer & Co., was in Toronto on Jan. 22nd.

Mr. Guernsey is spending some weeks in Cobalt in the interests of the Consolidated Mining & Smelting Company.

Mr. George E. Leighton, representative of the Hardy Patent Pick Company, was in Toronto on Jan. 22nd and 23rd. Mr. Leighton has just completed a tour through the coal mines of Nova Scotia and the mines of Cobalt.

The death is announced of Alexander Macdonald (Big Aleck), who became famous some years ago on account of his acquisition of wealth in the Klondike. Mr. Macdonald was a native of Antigonish County, Nova Scotia. A short time ago he lost his entire fortune, but by dint of hard and plucky work he had become a wealthy man.



## INDUSTRIAL PAGE.

### DALLETT COMPRESSORS.

A complete line of air compressors as built by the Thos. N. Dallett Co., of Philadelphia, Pa., bring out many excellent and unique ideas in compressor design.

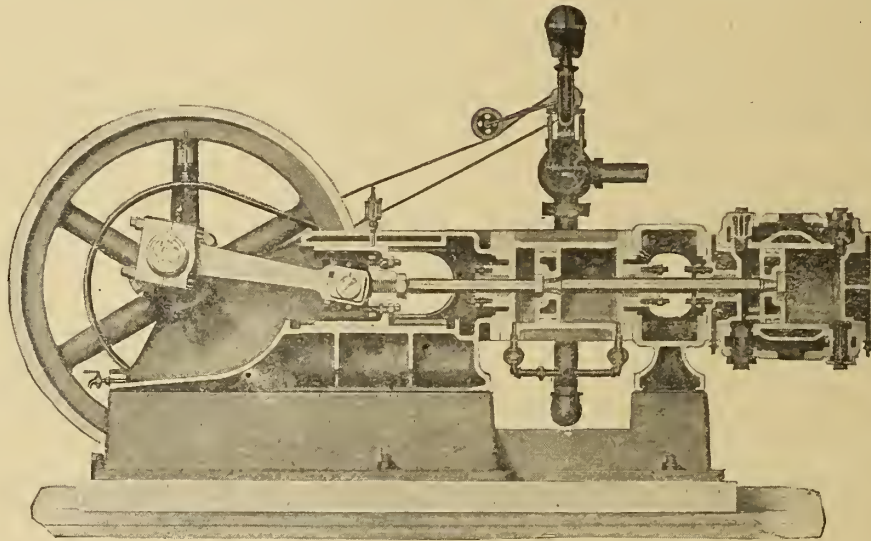
These compressors incorporate the essential features of having all parts requiring adjustment or renewals, readily accessible, utilizing only the best material and workmanship throughout. A liberal amount of metal, scientifically placed, is used to insure rigidity in operation.

The frame is of the open-work centre-crank type, graceful and pleasing in outline, and of an especially massive and rigid design to obtain on each size compressor a greater range of capacity by substituting, when desired, a cylinder of the next larger size than the standard to operate at 100-lb. pressure. For example, on an 8-inch stroke compressor the regular cylinder for 100-lb. pressure is 8 inches in diameter; but a 10-inch diameter cylinder can be substituted and still operate at the above pressure, whereby a greater volume of air

a rough temporary foundation of timbers, or a permanent one of concrete or brick. An oil gutter is provided entirely around the lower base flange on all sub-bases. This is an excellent feature, as it insures a clean foundation and floor free from unsightly oil puddles and stains.

The steam cylinder and valve gear of the steam driven machines are examples of up-to-date steam engine practice, and are suited to the operation of compressors, giving high efficiency with slight attention. All steam ports are short and direct and of the proper area. The clearance has been reduced to a minimum, giving appreciable saving in steam consumption. A plain D balanced slide valve is used on the small and medium sized machines; the Meyer balanced adjustable cut-off valve being employed on the larger machines. To provide efficient heat insulation, all steam cylinders are lagged with a mineral wool and neatly jacketed with planished sheet steel.

The rocker arms on all valve gears are provided



Sectional Elevation of Single Steam Machine.

is obtained with but a slight increase in cost of machine.

The cross head guides are cylindrical and are bored at the same setting as the boring and facing of the end which receives the cylinder. This insures absolute alignment, as the end is flanged for bolting the cylinder to the frame. The convenience in tightening the cylinder stud nuts, which are on the outside, will be appreciated by the user.

The main bearings are lined with a high-grade bab-bitt metal, which is poured into dovetailed recesses and is thoroughly pinned in to obviate shrinkage, and then bored and scraped to fit the crank shaft.

Lubrication is effected by means of high-grade sight feed devices, or by gravity or force feed system, as desired, and drains are provided for draining off all drippings from guides, stuffing boxes, and crank pit.

Th duplex belt, duplex steam and single steam machines are supported on an exceptionally rigid and deep sub-base, thus making the entire machine self-contained and obviating any possibility of getting out of line, and insuring satisfactory operation on either

with means for adjustment, doing away with all lost motion.

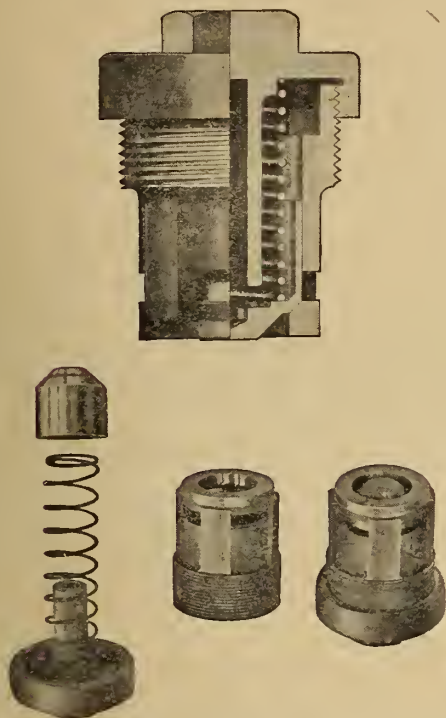
On every steam-driven machine the governor is equipped with a safety stop device, which immediately stops the machine in case the governor belt should break.

In the case of duplex compressors with compound steam cylinders, a difficulty has been that if the machine stops with the high pressure side on dead centre, which occurs frequently, it will not start automatically, this being due to the fact that but one side (the high pressure) takes steam from the line. This trouble has been overcome by using a reducing valve of standard make, which reduces the live steam pressure for use in the low-pressure cylinder. Thus if the high-pressure side stops on the dead centre, live steam is fed to the low-pressure cylinder through the reducing valve, starting the compressor. It is obvious that steam from the boiler is taken into the low-pressure side only when starting, otherwise the operation is identical with any compound machine.

The air and steam cylinders are tied together and



held in position by means of an internally flanged tie or distance piece. On the smaller sizes this piece supports the air cylinder, but on the larger sizes the air cylinder is supported on a pedestal, while the tie piece is of circular design without foot piece. Ample openings are provided on each side of the tie piece to allow



Air Discharge Valves.

adjustment of the stuffing boxes and tightening the cylinder stud bolts.

The air cylinders are of a special hard, close-grained iron and allowance is made for rebor-ing if necessary. Suitable means are provided to obviate any chance of the air valves being drawn into the cylinder in case of breakage. Each cylinder is thoroughly tested before assembling under hydraulic pressure of 200 pounds, and all defective castings are eliminated. The clearance space is reduced to a minimum, and all heads and cylinder walls are thoroughly water jacketed, thus obtaining the highest efficiency possible. Means are provided for draining the cylinder and cylinder head jackets of water, this being essential in cold weather. The lubricant is fed directly into the intake passage, allowing the suction to carry the oil into the cylinder in the form of a fine spray. This mode of lubrication has been thoroughly tried out and found to give efficient and equal lubrication of all working parts.

Mechanically operated inlet valves are supplied on any size compressor if desired. Any of the "Dallett" standard low-pressure compressors are suitable for vacuum service, and are furnished with mechanically-operated inlet valves for a high vacuum.

The piston rod on both belt and steam machines is designed to allow for returning in case of wear. In returning a rod, allowance has been made in size to leave the threads untouched, only necessitating the turning of the straight diameter of the rod.

The cross head is a new type box pattern, made of semi-steel. Its shoes are adjustable and of large bearing surface. The upper shoe is lubricated by means of a sight feed lubricator, and the lower shoe runs continually in a bath of oil. One of the features of this

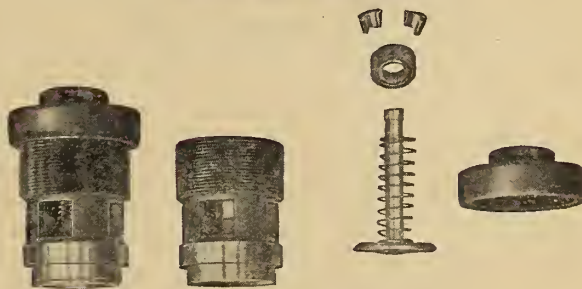
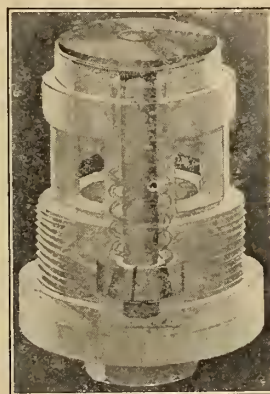
design is the side openings, which allow easy access to the cross head shoe binder bolts. The cross head pin is tool steel, hardened and ground. It is fitted to tapered seats in the cross head, drawn tight on the tapers by means of a nut held in position by a pin. Means are provided for turning one-quarter revolution in case it wears flat on the two bearing sides, thus doubling the wearing capacity.

The intake valve is of the automatic poppet type, contained in a malleable iron cage. The cage is one piece and combines both seat for the valve and guide for the valve stem. The cage is threaded and screws into the wall of the air intake chamber only and is simply seated in a recess on the main cylinder wall, using thin corrugated copper gaskets to secure a tight point. A hexagonal recess has been cast in all cages to accommodate a special cast steel wrench for use in removing and replacing valve cages.

The valve cage cap acts as a lock nut for holding the cage in place after it has been screwed down on its seat in the cylinder. In the case of a compound machine, corrugated copper gaskets are placed under the valve cage caps on the high-pressure cylinder to insure against any leakage, as the discharge pressure from the low-pressure cylinder is constantly at these joints.

The valve proper is a special alloy hardened steel, with seat and stem ground to gauge. The valve spring is of phosphor bronze and of the right proportion to give the valve an easy opening and a quick closure.

Much annoyance and trouble has been caused on certain makes of intake valves due to the spring holders shearing off or working loose. The cause of this trouble is the sudden stopping of the valve on its seat, which tends to drive the spring holder off the valve



Air Inlet Valve.

stem. This effect may be likened to driving a hammer on its handle by means of hitting the handle on its opposite end. The principle involved is identical.

To eliminate this defect and the trouble caused by threading and pinning the spring holder to the valve stem, solid ends have been employed by some builders,



which necessitates a split guide and complicates the valve parts.

On the "Dallett" valve the spring holder comprises a split taper ring set in a recess on the valve stem, and held together and tight to the stem by means of a solid taper ring slipping down over it. The hammering of the valve on its seat tends to tighten the spring holder on the stem instead of driving it off, due to the action of the taper.

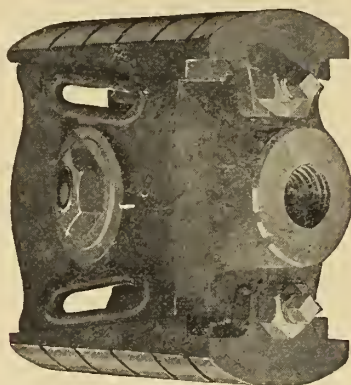
The discharge valve is of the automatic poppet type contained in a valve cage of malleable iron. The method of seating in the cylinder and locking to its seat is identical with that of the intake valve. A projection or boss has been provided on the valve cap which acts as a positive stop for the valve when it has reached a lift giving full opening area, and does away with fluttering. This same projection on the cap also acts as a spring guide for the valve spring.

The discharge valve, light and of ample area, is of the same material as the inlet, having all wearing surfaces ground to gauge.

Both inlet and discharge valves are simple and compact, and each valve requires not over a minute's time for removal complete.

The connecting rod is of the marine type and is to be depended upon for the most severe duty. It is made of the best crucible steel, and both crank pin and cross head boxes are made of the highest quality phosphor bronze bearing metal. Adjustment is obtained at the cross head end by means of a wedge and split box. The crank pin end is adjusted by means of removable tin liners, and both bearing surfaces are of extremely liberal proportion, lubricated by wick wipers.

The crank shaft on both single and duplex machines is exceptionally massive, forged out of a solid billet of mild open-hearth steel, carefully turned and polished. In the case of a duplex shaft, the portion in the centre is enlarged to accommodate the heavy fly wheel.



Cross Head.

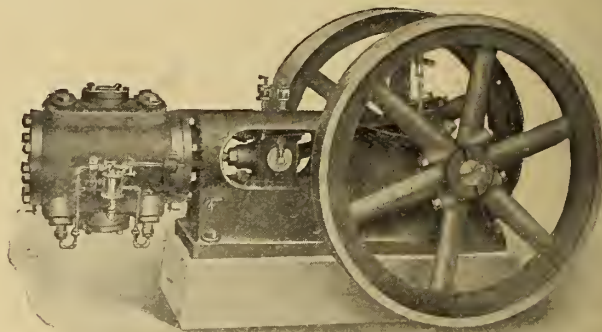
The wheels on all machines are heavy and of large diameter, insuring smooth operation and in the case of belt machines, the face is very wide. The fly wheels on the larger machines have square-cored holes in the rim to facilitate turning over by hand.

The inter-cooler plays a very important part in economical operation of a two-stage machine. The "Dallett" inter-cooler is of large cooling area, employing the return flow type of water circulation, using baffle plates to deflect the flow of air and aid in its effectual contact with the cooling tubes. This method is efficient in reducing the temperature of air between stages to approximately the original temperature, thus tending to reduce the final or discharge temperature

and also the horsepower required for a given capacity. The nest of cooling tubes may be removed intact from the inter-cooler box without disturbing any of the piping, as unions are supplied to obviate this feature. The inter-cooler is supplied with pop safety valve, pressure gauge and drain valve.

In a compressed air plant the demand for air is often of such an intermittent character that automatic regulation of the supply of air in accordance with the demand becomes a necessity.

The belt-driven machines are provided with an unloading device which automatically unloads the air cylinder. When a certain determined pressure is reached in the air receiver, one or more inlet valves at both ends



Single Belt Driven Compressor.

of the air cylinder are held open and the load is taken off the compressor, allowing it to run light until the pressure drops in the receiver, upon which the valves are released and air compression is resumed.

On the steam machines, a combined speed and pressure governor is used. This governor unloads the air cylinder exactly the same as on a belt-driven machine, and at the same time it controls the speed, allowing a single steam machine to just turn over, when unloaded, and bringing a duplex or compound machine to a dead stop. By this means a great saving in steam is effected and the wear and tear on the working parts is reduced.

A complete unloading equipment is furnished with each machine.

The compressors described are built in sizes from 8-inch stroke up to and including 16-inch stroke, and give a range of capacity from 79 cu. ft. of free air per minute to 1,200 cu. ft.

Special machines for any capacity, pressure or service, or any standard machine direct connected to motor, water wheel, or gas engine, can be furnished in addition to the standard line.

Sullivan rock drills, air compressors and hammer drills are now carried in stock at Spokane, Washington, by the United Iron Works, who have succeeded the Bradley Engineering & Machinery Company, as agents for the Sullivan Machinery Company. The United Iron Works also represents the Sullivan Machinery Company at Seattle, and will carry a stock of drills, compressors and supplies at that point, 109 Main St. Mr. Austin Y. Hoy, is the personal representative of the Sullivan Company in this territory with headquarters at Spokane.



## SPECIAL CORRESPONDENCE

## NOVA SCOTIA.

**Glace Bay.—U. M. W. of America and the Coal Companies.**—After organizing a "local" of the United Mine Workers of America in Springhill, the paid organizer of this organization has visited Cape Breton, and during the past few weeks there has been great activity in the miners' lodges. One or two of the P. W. A. lodges have gone over bodily to the newcomer. Other lodges are stated by the U. M. W. of America leaders to be dissolved, while the P. W. A. supporters say they are not dissolved, but are still in vigorous existence. One of the most important of the lodges, that at Caledonia Colliery, was declared by supporters of the American body to be dissolved, the charter was ordered to be returned to the Grand Officers of the P. W. A., and steps were taken to realize on the property owned by the lodge. The minority of P. W. A. supporters reorganized themselves, and through the Grand Council of the P. W. A. have applied for an injunction restraining the U. M. W. of America from dividing the property of the lodge among the members. The injunction was granted, and will in all probability be continued until the action of the U. M. W. of America against the P. W. A. is tried, which will, it is expected, take place at Sydney in April. On the result of the main action the continuance or otherwise of the several injunctions and cross-injunctions granted by the courts will of course depend.

Some incertitude has existed as to the attitude which would be adopted by the operators towards the new order, but the coal companies have now declared themselves, and state that they will not recognize the U. M. W. of America as representing their workmen. The Glace Bay Gazette published an interview with the general manager of the Dominion Coal Company on the 20th of January, in which the Coal Company have made public their attitude towards the present agitation, and their views on the general situation thereby brought about. Briefly, the statement of the Coal Company is that they will not recognize the U. M. W. of America; that to do so was impossible because the company had an agreement with the P. W. A. as representing all their workmen, and must keep faith with that organization, as it had been their experience that the P. W. A. was loyal to its undertakings. In the course of this interview the general manager of the Coal Company made the following serious statement: "I am of the opinion that the whole campaign is a direct attack on the Canadian coal trade, which has always been regarded with jealous eyes by the United States operators, and it is the duty of every patriotic Canadian to use his best endeavor to preserve to the people of Canada that which justly belongs to them."

The Nova Scotia Steel and Coal Company have taken the same stand, and it is understood the mainland operators have adopted the same attitude.

The startling increase in the imports of United States coal into the Montreal market, the recrudescence of the agitation against the import coal duty, the persistent competition that is being met with from United States sources, taken together with the present activities of the U. M. W. of America at a time when the large railway contracts are being negotiated, is a concatenation of circumstances that bode ill for the Nova Scotian coal industry.

**Eight Hour Day Commission.**—The commission appointed by the Local Government has commenced its tour, and it is expected evidence will be taken at Glace Bay about the 25th of January.

## ONTARIO.

**Cobalt.**—There has been published not a little criticism of official statements made concerning several of the leading Cobalt mines. The Canadian Mining Journal spoke disapprovingly of the manner in which La Rose flotation was put upon

the market. Since that time La Rose affairs have been conducted with sobriety and with a businesslike air. I don't mean to attribute this to anything said by the Journal. It is due rather to the fact that La Rose executive awakened to the fact that publicity is a darned good thing when properly used. All of the larger mines are waking to this idea. Nipissing gives out full statements. Trethewey partly follows suit. Coniagas, a private corporation, does likewise.

All of us will be glad to see other mines follow the example of those mentioned above.

Lately, Crown Reserve has been getting whacked. Mr. Alex. Gray, who has a keen scent and a prolific pen, took kindly exception to Manager Cohen's assertions as to mining costs. A stockholder of Crown Reserve replying to Mr. Gray, states that Mr. Gray's figures are excessive, and that he has overlooked several factors in making his calculations. I do not care to take sides in this controversy. To me the point seems this: It is remarkable that silver can be mined at a cost of between 8¾ cents (Mr. Gray's figure) and 7½ cents (Mr. Cohen's figure). This fact speaks volumes for the mine and for Cobalt generally. So far as the dispute is concerned, both Mr. Gray and Mr. Cohen are perfectly able to take care of themselves.

Speaking of publicity, is it not time that we knew something about the Provincial mine? If it is a success, we should know. If it is a failure, we have a greater claim to know. The Province is spending money there. The money is yours and mine and the other fellow's. There is no disgrace in any event.

Gowganda is on everybody's mind—everybody, that is, who is not making money in Cobalt. Development up to date has shown several exceedingly rich surface showings. Crowds are rushing in. Many are about as much prepared to face the weather as a three-shell man is to preach the gospel. Snowshoe staking is the order of the day. There will be awful slaughter when the inspectors get down to business next spring.

The Elk Lake district is about a year and a half old. The work that has been done there gives one a fair measure of what may be expected at Gowganda one year hence. Of course, there will be better transportation and all that sort of thing. Nevertheless, the whole country will stand a lot of development. At present a few men with claims to sell are doing a whole lot of damage to the district by shouting too much. The whole truth, apart from excitement, is that the country all around Gowganda gives rich surface indications. This is qualified by the general truth that all the veins discovered are not at all extensive. No one but a fool would attempt to prophesy about the depth, and so on. But there is lots of room for good honest work. This cannot begin until next spring. So when you hear marvellous stories of Gowganda don't be tempted to have a look in until the fakirs have finished their winter campaign. It doesn't pay to get excited.

Now, this does not mean "knocking." The country doesn't require either "knocking" or "boosting." What it needs is the truth as nearly as human beings can come to the truth. Since only a little truth is visible under four feet of snow, we'll have to wait until the April sun has done its business.

Mr. Fraleck, of Cobalt Lake Mining Company, is in Toronto.

Capt. J. E. Leckie is also in the metropolis.

There are a good many well-qualified young fellows, college graduates and others, looking around for prospecting work. A good way for an investor to get his money's worth is to send out a reliable man to prospect for him. Then he'll have the satisfaction of getting one or more good claims—or nothing. And there may be many more Gowgandas.



## BRITISH COLUMBIA.

**Phoenix.**—The new year is starting off with steady and heavy shipments from the various mines now working and things look good for the coming twelve months.

Development in the Phoenix Amalgamated group of the Consolidated Co. is showing up a richer body of ore than it was at first expected the strike of some weeks ago would run. The blocking out of shipping ore on the property continues and arrangements are being made to build a tramway and spur in order that the shipping of ore will be facilitated when the company is ready to ship.

There is nothing new in Dominion Copper affairs. Authorities seem inclined to advise stockholders in that company to keep their stock rather than sell at the very low prices now offered by brokers. Mr. P. F. Roosa, liquidator, has returned from New York but has nothing definite to say. It is said that the engineers who went over the property of the Dominion Copper Co. state that it is not worth more than \$400,000, about one-half of the amount of the outstanding bonds, which amount to \$800,000, then there is about \$100,000 of floating debt and 500,000 shares of stock of a par value of \$5 to be looked after. It makes the situation look dark. But the property has a prospective value under working conditions that may be taken into consideration; what this prospective value is would be hard to say. If the men in charge of the reorganization are inclined to be fair to the stockholders it would seem advisable to have them participate in that reorganization, either by an assessment of some advantage over the general public in the way of securing stock in the new concern, turning in their stock in the Dominion Copper Co.

M. K. Rogers is again to be more intimately connected with the Daly Reduction Co., Hedley, than he has been since he resigned active charge of the work.

The tunnel on the Kingston, Hedley, after leaving the dyke entered a good body of ore. Drifting is now in progress along the contact.

Considerable interest is being taken in the coal measures known to exist in the Similkameen and Nicola districts, and much active work is being done on the properties. It is stated that American capitalists are thinking of building a smelter at or near Oreville, Wash. Should such a plant be erected at this point coke from the Similkameen or Nicola mines would be more likely to find a market there than that from any other district, as a neat sum could be saved in freight rates.

The tunnel on the Bell, Wallace mountain has cut a six-inch vein of rich silver-gold ore. Work is being extended on this adit to tap the main ledge.

Anent the copper combine that is being formed in the Eastern United States, it is stated that neither the Granby nor any of the other British Columbia copper producers are directly interested.

Things are forming themselves for a dividend from the British Columbia Copper Co. This concern, since they resumed work in June, 1908, (to the end of November) made a net earning of \$232,609 from their mining and smelting operations. About 5,547,874 lb. copper was made during the six months. When work was resumed early in the year there was an outstanding debt of \$170,000, which has been paid off and there was a sum in the neighborhood of \$25,000 on hand Nov. 30th. It had been suggested that a surplus of \$100,000 be acquired before dividends were paid; even if this policy is carried out a dividend will be forthcoming early in the present year, 1909.

The tunnel on the Woodburn is now in over 350 feet. It is expected the ledge being driven for will be entered before another fifty feet has been driven.

**Rosslund.**—The Rosslund mines continue to make a steady output. The Le Roi is attracting more than usual attention by the good results being obtained in the operations of mine and smelter. The mine manager's report for November, for example, shows that 6,150 tons of ore were shipped that carried 4,178 ozs. gold, 1,900 ozs. silver and 91,000 lbs. copper. In development work \$12,000 was spent. This output in the gross is valued at \$100,000 and after operating expenses are deducted will show a substantial profit.

The Le Roi 2, Ltd., in November, shipped 2,420 tons, from which the smelter receipts were \$28,795.50.

Some good results have been secured from shipments of select ore from the Blue Bird, Nest Egg and Evening Star mines and considerable work on the smaller properties is likely to be done during the coming year.

**Nelson.**—The zinc smelter is a success! This is the verdict after exhaustive tests, and, finally, the treatment of commercial shipments of zinc ore. The plant of the Canada Zinc Co. has been five years in arriving at its present stage and represents an outlay of nearly \$125,000, of which the Provincial Government advanced \$20,000. The smelter is 10 tons per day capacity at present, but now that it has passed the experimental stage the capacity will be increased to 30 tons per day. The ore so far treated has averaged 40 per cent. zinc, 10 per cent. lead, 12 oz. silver, and 1.5 per cent. copper per ton. The copper is saved in the form of matte. A vertical furnace, heated internally by electricity is used at this smelter. The electrical heating does not destroy the metallic gas, which is the result of heating zinc to a certain point, and any lead in the charge falls to the bottom of the furnace and can be collected separately from the spelter. It can be readily seen what the advantages of this arrangement are over that of treating ore in horizontal retorts as practiced in the zinc smelters. Much labor is done away with and there no expense for breakage or first supply of retorts, etc. The smelters in this district, and elsewhere, penalize zinc ores, as the blast consumes the metallic gas into which the zinc changes, leaving an infusible zinc oxide residue, which eventually leads to the clogging of the furnaces. The condition at the Sullivan mines is a good example of this: Zinc in this district is associated with the lead ore from the surface, where it runs in well defined veins, and can be handled with little trouble, but at depth the zinc blends with the other ore and increases in quantity. In the Sullivan mines this condition reached such an acute stage that the smelter was closed down, the furnaces not being able to handle the ore profitably, as it contained such a quantity of zinc.

The solution of the problem of smelting zinc ore or lead ores containing a percentage of zinc is very welcome to the lead-silver miners of this district, as it will mean in the future a greater production of mines that have hitherto been greatly handicapped and money kept in the country, that was formerly paid foreign smelters for the treatment of zinc.

Kaslo is quite a lead-zinc centre and since the announcement of the success of the Nelson zinc smelter quite a change has taken place for the better. It is stated there are several deals of importance on for promising mines in that section.

The Lucky Jim, at one time a silver-lead shipper, but which afterward developed into a silver-zinc mine, has been bonded to men connected with the Standard Oil Co. It was examined last week by E. W. Jessen and W. A. Bradley, of Spokane, for the Eastern capitalists.

**Vancouver.**—It is said that T. J. Smith raised nearly \$200,000 during 1908 and placed the affairs of the Diamond Vale Coal Co. on a sound basis. The mine is shipping about 100 tons per day.

A diamond drilling outfit is being placed to work on the claims of the Swayne Copper Co., Lynn Creek, across the inlet from this city. The president of the company, Dr. Sawyne, says the ore is self-fluxing, carries an average of 6½ per cent. copper and some gold.



## GENERAL MINING NEWS.

## NOVA SCOTIA.

**Glace Bay.**—The Dominion Coal Company has sufficient orders to keep every one of the mines going at half time for the next two months. It is hoped this year's output will reach the four million mark. There are over 6,000 miners on the payroll.

**Port Hood.**—Despite the unfavorable conditions during 1908, the Port Hood-Richmond Railway & Coal Company has given steady employment so far to miners and surface men. All coal has been marketed at paying prices, and prospects for the coming year are very bright.

**Reserve.**—No. 10 section in the east slope is to be reopened. The opening of this section will give employment to about 20 pair of hand cutters, and will relieve to a certain extent the overcrowding in other parts of the mine. No. 10 has started sinking for a new lift to be ready May 1st.

The erection of the new trestle for banking the Emery slack coal is proceeding very slowly on account of weather conditions, and it will be some days before coal can be banked.

## ONTARIO.

**Amherstburg.**—A large deposit of silica has been discovered near here. Analysis shows that it is nearly 96 per cent. pure, and with no trace of oil. The discovery will probably lead to the establishment of a glass factory in this county.

**Gowganda.**—The Canadian Northern Ontario has been accepting freight for Gowganda via Bellwood since January 20th. Passenger service on the sleigh road is expected to start Feb. 1st.

The T. & N. O. is considering the building of a branch line from Elk Lake to Gowganda.

Mining Recorder Torrance is accepting applications for filing subject to prior right, it being impossible to keep maps up to date from day to day. So great is the rush that a fourth assistant has recently been added to the staff.

Much litigation is expected over the withdrawal by the Government of the lakes, nearly every one of which has been applied for.

**Cobalt.**—Reports from Gowganda and Elk Lake say that there is danger of an outbreak of typhoid owing to prevailing conditions.

Many men are going into the country totally unprovided for the extreme cold, and much suffering is expected.

The shaft of the Otisse-Currie is down 47 feet by 11 feet. The vein, which was three inches wide at the surface, has broadened to 13 inches at the present level. The boilerhouse is completed, and the hoist, pump, and boiler installed.

**Cobalt.**—The framework of the O'Brien concentrator is complete. By the early months of spring it will be turning out concentrates. This will mean a particularly large saving in reight.

The Muggley concentrator has shipped 36 tons of concentrates to Perth Amboy, New Jersey.

A 60-minute motor car service is projected between Temami and New Liskeard by the T. & N. O. Railway Commission.

## BRITISH COLUMBIA.

**Nelson.**—A gold ingot weighing 304 ounces and valued at about \$5,000 was produced at the Nugget Mine on Sheep Creek. This is the fourth ingot made since the stamps were installed last November, making a total value of \$20,000 obtained from second-grade ore in two months.

**Ingenika.**—It is reported that bedrock is struck at a distance of 30 feet on the Ingenika R., and at 90 feet on McConnell Creek. The value at bedrock has not so far been ascertained, as the miners are troubled with over-supply of water.

**Grand Forks.**—E. Jacobs, Secretary of the Western Branch of the C. M. I., has sent out notices stating that the meeting called for January 14th at Greenwood has been postponed until January 25th. Trouble at the mines and smelters caused by shortage of power and general freezing up made it impossible for many members to attend on the original date.

**Kaslo.**—Negotiations are under way for the purchase of the True Blue Mine. The force is to be increased, and it is expected that the mine will soon become a regular shipper.

**Kaslo.**—Ore shipments through Kaslo in December were the lowest for several months, being only 881 tons, including silver-lead and zinc. The total shipments for the year amount to 13,691 tons, of which 6,318 tons were silver-lead and 7,373 tons zinc ores. Practically all the zinc tonnage came from the White water Deep Mine.

**Phoenix.**—About 240 men are working regularly at the Mother Lode Mine. In winter all the ore is mined from the interior stopes, and it requires a larger force to keep up the requirements of the smelters.

Practically all mining in the Boundary and West Kootenay was suspended for four days through lack of electrical power, anchor ice interfering with the plants.

**Greenwood.**—The fourth general meeting of the Canadian Mining Institute is to be held here on January 25th. The only nomination for chairman is that of Mr. T. Kiddie, manager of the Northport Smelter. Twelve members of Council of the branch will be elected by ballot. The members of the General Council will be members ex-officio of the Branch Council. The members are to be distributed territorially.

**Vancouver, Jan. 13.**—Vancouver men have acquired coal lands on Slate Chuck Creek, Queen Charlotte Islands, on which operations will start May 1st.

The formation is of sandstone, shale, and schist, and the coal a good anthracite. If the diamond drill proves coal at depth, it is proposed to erect a suitable plant. In order to handle both anthracite and bituminous coal, coke ovens and tram lines to deep water will be built.

Should the Queen Charlotte coal prove good, a line of steamers will be established between Queen Charlotte and Mexico, where the same people are reported to be establishing a large steel plant at a cost of ten million dollars. If the iron ores at Cumshwa Inlet are as represented, the same parties will doubtless establish steel works on Queen Charlotte Island.

**Windy Arm.**—The concentrator at the Venus Mine is now handling 100 tons per day, and preparations are being made to double this capacity.

The Montana Mine is now being developed by the Yukon District Gold Mining Co., which controls most of the mines now being worked.

The outlook has improved lately, on account of some excellent new discoveries. On the East Rand the Brokpan Mines has encountered some extremely rich ore. The New Modderfontein's extensive property has opened up satisfactorily, and the reduction and treatment plants have to be enlarged to deal with the increased output. On the Central Reef the City Deep Co. has exposed a quantity of ore assaying nearly £2 per ton. In the Main Reef West high values over a considerable area have been exposed.



# MINING NEWS OF THE WORLD.

## GREAT BRITAIN.

The Board of Trade returns show total exports of coal during 1908 amounting to 65,180,646 tons, valued at £41,615,923, as compared with 66,063,258 tons, valued at £42,118,994 in 1907. In addition, 19,474,174 tons were shipped for the use of steamers engaged in the foreign trade, as against 18,618,828 tons in 1907. The principal increases were in shipments to the North of Europe, while exports to Germany, Holland and Egypt showed a considerable decrease.

An estimate of the profits of South Wales collieries, based on the operations of twelve leading companies gives the gross profits per ton of output for 1907 as 2s. 5d. For the present year, taking into account the effects of the Eight Hour Act, the estimate of probable profit is 1s. per ton.

## RUSSIA.

There has been a considerable decrease in the gold industry on the Lena and the neighboring gold fields. But at Vitim and Olekma the situation is improving and the output increasing. At the mines of the old companies twice as much gold has been washed as formerly, and modern methods are being largely introduced.

## HUNGARY.

Fifty-six miners lost their lives by an explosion in the Auka coal mine at Veszprim, about 60 miles from Budapest, on the 14th of January.

## AUSTRALASIA.

A French syndicate, which has been operating for three years on an alluvial field known as McCaulay's Lead, 20 miles from Chatsworble, New South Wales, will put in modern gold-saving machinery, costing several thousand pounds, having been able to secure good results by primitive methods.

The Broken Hill Proprietary mine, New South Wales, has closed down, owing to the refusal of the men to accept a reduction of wages. Four thousand men are directly concerned, and a larger number indirectly affected. The question of wages will be referred to the Federal Arbitration Court.

The ore reserves of the North Lyell copper mine, Tasmania, have been increased by 169,121 tons during the six months ending September 30th. There is now available for stoping at the North Lyell 710,333 tons.

The discovery of a new tin-field in the Gunyale district, Victoria, is reported. Tin has been found on the surface, and an area of some 2,000 acres has been staked.

## SOUTH AFRICA.

Greater progress was made in the gold mining industry of the Rand during 1908 than in any previous year. The great

feature has been the general reduction in working expenses, owing to the installation of tube mills and larger batteries with heavier stamps and greater attention in the matter of securing efficiency in labor. Some of the larger mines fitted with up-to-date machinery capable of handling ore in large quantities are profitably crushing ore of as low value as 4½ dwts. to the ton. The chief mechanical appliance which has contributed to these improved conditions is the tube mill, of which some 115 were operating at last accounts, as compared with 72 at the beginning of last year. During November the average working costs of the mines on the Rand amounted to 17s. 6d. per ton, a reduction of 1d. per ton as compared with October.

The coal export trade via Delagoa Bay is assuming respectable dimensions. A shipment of 2,000 tons was recently made to Madras, India, being the first to that destination.

## UNITED STATES.

The Colorado Legislature is considering a bill providing for the creation of a state commission to control the smelting industry, along lines similar to those of the railroad commission. The measure also provides for a state assayer and for the erection of a refining and smelting plant at the State School of Mines at Golden, where smelting in all its branches may be taught.

The Heroult electrical smelting plant in Shasta County, California, operated by the Noble Electric Steel Co., is going ahead with installation, and the power is ready to be turned on when the smelters are finished.

About 150 miners were killed by two successive explosions on December 28th and January 12th at the Lick Branch colliery, near Bluefield, West Virginia. A disastrous gas explosion also took place at Joseph Leiter's colliery at Zeigler, Ill., on January 9th, resulting in the loss of 25 lives.

Diamond mining is being successfully prosecuted in Pike County, Arkansas. The total number of stones so far found is 540, of which 505 weighed 217 carats. The largest so far discovered weighs 6½ carats. Many of them are of good water and remarkable purity.

A merger of gold-dredging companies having interests near Folsom and at Oroville, Cal., has been effected, the cost of purchasing the interests involved being \$7,000,000. The new company is capitalized at \$25,000,000.

## MEXICO.

The Concheno Mines, in Chihuahua, purchased by the Greene Gold-Silver Co. from Corrigan, McKinney & Co., of Cleveland, O., for \$1,250,000, have reverted to the vendors on account of the inability of the purchasers to meet their payments.

Some of the Mexican mining corporations are planting eucalyptus trees on their properties to secure future supplies of mine timber, anticipating that present sources may before long be exhausted.

# COMPANY NOTES.

## NIPISSING ISSUES FINANCIAL STATEMENT.

A brief financial statement of the operating company dated January 1, 1909 shows cash and ore to total \$972,643 against \$977,000 at the end of September. In detail this statement shows:—

|                                        |           |
|----------------------------------------|-----------|
| Cash in bank and bullion on hand ..... | \$495,652 |
| Ore in transit and at smelters .....   | 380,828   |
| Ore sacked ready for shipment .....    | 96,163    |
| Total .....                            | \$972,643 |

The company is carrying less ore sacked and ready for shipment, the item falling below the \$100,000 mark, comparing with \$112,000 six months ago and \$200,000 nine months ago.

## BROME COUNTY ASBESTOS CO.

The annual meeting of the shareholders of the Brome County Asbestos Co., Ltd., was held at the head office of the company in Eastman on the 19th inst., when the same Board of Directors were re-elected, and the following officials were appointed: F



A. Olmstead, President; C. A. Nutting, Vice-President; A. C. Lytle, Secretary-Treasurer.

The net earnings of the British Canadian Asbestos Company for the seven months of the fiscal year ending December 21st amounted in round numbers to \$110,000, so that after deducting bond interest for the entire year, viz., \$50,000, a surplus of approximately \$60,000 was left over, equal to 6 per cent. on the stock.

#### BRITISH COLUMBIA COPPER DIVIDENDS.

The directors of the British Columbia Copper Company intend to resume the payment of dividends early during the coming year. The company declared its initial quarterly dividend of 25 cents per share, and an extra disbursement of 15 cents a share, or a total of 40 cents a share, on July 18th, 1907. The directors are in favor of paying 2 per cent. bi-monthly or 12 per cent. a year. A dividend of 2 per cent. on the preferred shares of this company for the quarter ending December 31st, 1908, has been declared.

#### PONTIAC SILVER MINING CO.

A meeting of the directors of the Pontiac Silver Mining Company was held in Toronto on January 22nd. The following officers were elected: President, Clifford H. Moore, of Cobalt; Vice-President, W. E. F. Paine, of Toronto; Managing Director, Harold P. Davis, of Cobalt.

The capital of this company is \$1,000,000, divided into one million shares of \$1 each, with 300,000 shares in the treasury.

The directors of the company have authorized the sale of 100,000 shares of the treasury stock at 30 cents a share, and a large proportion of this issue has already been taken up by individuals interested in the company.

A small plant will be installed at once. The Flynn property, which consists of 22 2-10 acres, adjoins the Drummond Mine, and was purchased in November by Mr. Harold P. Davis. Since that time a force of men has been at work. Early in December the discovery was made of a rich vein of calcite and silver. After obtaining a satisfactory report from Mr. Frank C. Loring, the Pontiac Silver Mining Company was organized to take over his property.

A shaft has been sunk 25 feet on this vein, some distance from the original discovery, with favorable results.

The vein in the bottom of the shaft is from 10 to 20 inches wide, and carries silver values from the surface, ranging from 0 oz. upwards.

It is the intention of the management to sink this shaft to depth of 100 feet, and drift on the vein at the 50-foot and 00 foot levels. There is every indication that the drift at the 0-foot level will develop a body of high-grade silver ore.

The Board of Directors of the Kerr Lake Mining Company on January 7th declared a quarterly dividend of 4 per cent. upon the capital stock of the company, payable March 15th, 1909, to stockholders on record at close of business March 1st, 1909. Transfer books will be closed from 3 p.m., March 1st, 1909, to 10 m., March 6th, 1909. This is dividend No. 14.

The City of Cobalt Mining Co., Limited, has received permission to increase its capital stock from \$500,000 to \$1,500,000.

Dominion Coal has declared the usual half-yearly dividend of 3½ per cent. on the preferred stock, payable February 1st.

The Ontario Government has received a cheque for \$15,000, being royalty for the last three months of 1908 from the Crown Reserve Mine. The Government receives this on a 10 per cent. basis.

An extra monthly dividend of 1 per cent. has been declared by the directors of the Buffalo Cobalt Mines, Limited. The

dividend is payable on February 1st to shareholders of record January 20th. The books will be closed on January 20th and re-opened on February 2nd. This is the second monthly dividend declared by the Buffalo Mines, the first being paid on January 1st, together with a quarterly dividend of 5 per cent.

#### TRETHEWEY SILVER-COBALT MINE, LIMITED.

##### DIRECTORS' REPORT.

To be Submitted to the Annual Meeting of Shareholders to be Held at Toronto on Wednesday, the 27th day of January, 1909.

The Directors have pleasure in submitting the following Report, Statement of Revenue and Expenditure, and Balance Sheet, covering the period from 31st August, 1907, to 31st December, 1908:—

|                                                                                       |              |
|---------------------------------------------------------------------------------------|--------------|
| The total Revenue from all sources during the above-mentioned period amounted to..... | \$357,970 78 |
| The total Expenditure chargeable against the period was .....                         | 147,446 47   |

|                                                                                             |              |
|---------------------------------------------------------------------------------------------|--------------|
| Showing a surplus of Revenue over Expenditure of.....                                       | \$210,524 31 |
| Out of which sum Dividends have been paid, amounting to 15 per cent. of Issued Capital..... | 141,817 50   |

|                                                                                 |                  |
|---------------------------------------------------------------------------------|------------------|
| Leaving a balance of .....                                                      | \$68,706 81      |
| The balance at credit of Revenue Account on previous balance sheet was.....     | \$48,886 79      |
| Against which are chargeable payments made in present period amounting to ..... | 4,485 35         |
|                                                                                 | <u>44,401 44</u> |

|                                                                                                                                       |              |
|---------------------------------------------------------------------------------------------------------------------------------------|--------------|
| The Balance at credit of Revenue Account at December 31st, 1908, being.....                                                           | \$113,108 25 |
| Additions to buildings and equipment installed during the period amount to \$15,661.46, bringing the total of these accounts to ..... | 50,808 71    |
| Less Depreciation .....                                                                                                               | 5,351 58     |

|                                               |             |
|-----------------------------------------------|-------------|
| Leaving a present estimated valuation of..... | \$45,456 13 |
|-----------------------------------------------|-------------|

Repairs to buildings, equipment and plant, and all replacements, amounting to the sum of \$6,349.85, have been charged to operating expenses.

The liquid assets of the Company as at 31st December, 1908, consisting of cash in hand, due from Smelters, and ore in transit, amount to \$139,309.15. The ore in transit and due from smelters is estimated on the basis of the price of silver on the 31st December, 1908, namely, 50¼c per oz. Each one cent per oz. advance in the price of silver adds approximately \$2,500 to the liquid assets.

The total ascertained liabilities amount to \$11,522.31.

##### Production.

The production and receipts from the sale of ore have been as follows:—

|                                               |              |
|-----------------------------------------------|--------------|
| Gross value of ore of all grades shipped..... | \$398,638 47 |
| Freight and treatment charges .....           | 42,958 14    |

|                                |              |
|--------------------------------|--------------|
| Revenue from sale of ore ..... | \$355,680 33 |
|--------------------------------|--------------|

##### Improvements.

Numerous improvements and additions to property and plant have been made, including a partial concentrating plant hereinafter referred to; machine drill sharpener; condenser; electric generator; triplex pump and motor, driven by a high-speed Robb-Armstrong engine, etc.

The heating plant has been rearranged to utilize waste heat from exhaust steam, and many other minor improvements have been made in various departments.



### Development.

There are now three working shafts, situated near the southerly end of the property. No. 1 and No. 2—approximately 650 ft. apart—are connected by a drift on vein "F" at the first, or 50 ft. level. No. 2 and No. 3 shafts—110 ft. apart—are connected at the second level, which is 140 ft. below the collar of No. 2 shaft. No. 3 shaft has been sunk to a depth of over 200 ft., where a third level is being run east to the Nipissing boundary and west towards and under No. 2 shaft.

The total amount of shaft sinking, upraising, drifting and cross-cutting in these workings is over 4,500 ft.

Several thousand feet of surface work has been done, consisting of trenching, open cutting, and sinking prospecting shafts on veins and fissures occurring towards the northerly end of the property, but owing to the geological conditions there existing these operations failed to disclose any ore bodies of economic value. It has been demonstrated that the veins in that locality, with one exception, namely, the discovery vein on the Temiskaming & Hudson Bay location, do not carry values until considerable depth is reached, which confirms the experience already gained by this Company and referred to in the last Annual Report. By arrangement with the Temiskaming & Hudson Bay Company, a tunnel was run from the workings at their 100 ft. level towards and across the Trethewey north line, where the apex of a rich silver vein was encountered. This is now being developed from the 150 ft. level of the neighboring property, and from present indications should prove to be an important source of additional revenue to this Company. When sufficient development work has been done at the north end it is the intention of the management to sink a working shaft near the centre of the location. This will enable operations to be conducted from a central point and render it feasible to undertake systematic underground exploration of the property, which has as yet been developed within only a comparatively small portion of its area. There are numerous veins of no economic value showing at many places on the surface, some of which it is reasonable to assume may prove to occur under the same conditions as the north vein and be found to carry values at depth.

Diamond drilling operations were discontinued early in last year, after several veins had been located and important geological information gained, which has been turned to account in the conduct of mining operations.

Owing to the impossibility of accurately estimating the amount and value of ore placed technically in sight by development work on veins of the character existing in the camp, no attempt has been made to make such estimate, and the total cost of all exploratory and development work has been and will continue to be charged to operating expenses.

It is the intention of the Directors to continue an aggressive policy of development. Sinking will be resumed in the near future at No. 3 shaft, so as to carry on operations at greater depth on the various veins occurring in that locality. It is also intended to resume drifting from the lower level west from No. 1 shaft. This drift was abandoned in "Keewatin," where silver values had ceased to be found, although the vein remains strong and well-defined. Underlying the Keewatin a boss of diabase outcrops to the west, and the intention is to continue drifting through the Keewatin into the diabase in order to ascertain whether the silver values will re-occur when the vein enters the latter formation. In the event of this proving to be the case, sinking at No. 1 shaft may be resumed with confidence of reaching deeper ore deposits of value at that point.

### Concentrating.

The system of treating ores adopted at the mine is at present confined to crushing and hand sorting, followed by partial concentration in a double compartment Hartz jig, the hutch product from which is treated on a coarse concentrating table. By the above process the grade of ore formerly shipped as screenings, running from 100 to 200 oz. per ton, and carrying about

70 per cent. of country rock is made to produce a high-grade product running from 1,500 to 2,000 oz. per ton, thus saving a heavy expenditure for freight and treatment charges on the bulk of the material formerly shipped. These operations are exceedingly satisfactory, only a very low-grade ore being sent to the dump for future treatment.

The question of erecting a more elaborate concentrating plant has been deferred for many reasons, amongst them being the prospect of the establishment of a local reduction works for the complete treatment of Silver-Cobalt ores. The results obtained from actual practice in the concentrating plants already established in the camp show losses varying from 15 to 25 per cent. of the assay value of the ores dealt with, while the resultant product has to bear the existing high rates of freight and treatment charges before net returns are reached. If treated to a finish at local reduction works at the minimum of cost with a saving of 98 per cent. to 99 per cent. of the assay values, a large tonnage of low-grade ore will be rendered available for profitable treatment, which, more particularly at the present low price of silver, will barely stand the cost of existing methods.

A test run of low-grade ore is being made at the present time through the mill of the Northern Concentrator Company at Cobalt, the results of which will be reported at the Annual Meeting, at which there will also be produced maps and plans showing the position of underground workings as at 31st December, 1908.

ALEX. M. HAY, President.

Toronto, Jan. 16th, 1909.

Shareholders of Temiskaming have received the following circular:—

"Whereas the Pennsylvania-Cobalt Silver Mines, Limited, is a corporation with an authorized capital stock of \$1,000,000, divided into 1,000,000 shares of the par value of \$1.00 each;

"And whereas this company is the holder of 499,997 fully paid shares of the said capital stock, and 300 shares of the said capital stock are also held by the nominees of this company;

"And whereas the directors authorized and directed B. E. Cartwright and Alexander Faskin to negotiate for the purchase of 500,000 fully paid-up shares of Pennsylvania-Cobalt Silver Mines, Limited, at a price not exceeding \$100,000;

"And whereas on the 20th day of October, 1908, the said Cartwright purchased the said 500,000 shares, the price to be paid being 100,000 fully paid shares of the capital stock of this company;

"And whereas the said purchase by the said Cartwright has been confirmed by the directors of the company, and R. A. Cartwright has, at the request of the company, paid to the vendor the 100,000 fully paid shares of the capital stock of this company, being the purchase price of the said stock so purchased

"Now be it enacted as a by-law of this company that upon the said 500,000 fully paid-up shares of the capital stock of Pennsylvania-Cobalt Silver Mines, Limited, being transferred to this company, 100,000 fully paid-up shares of the capital stock of this company be issued and allotted to the said R. A. Cartwright or to his nominees. And further that the said shares so to be allotted shall carry dividends as and from the said 20 day of October, 1908, and that the dividend declare payable on January 1st next, to shareholders of record at the close of business on the 18th day of December, 1908, to be paid to the said R. A. Cartwright on the said 100,000 shares so to be issued to him as aforesaid on the first day of January 1909.

"Passed this 5th day of December, A.D. 1909."



# STATISTICS AND RETURNS.

## CROW'S NEST COAL.

The Crow's Nest Pass Coal output for the week ending January 8th was 7,926 tons, compared with 23,379 tons last year.

The output of the Crow's Nest Pass Coal Company collieries for the week ending January 15th was 12,753 tons, making the daily average 2,125 tons. The general manager adds to his report that weather conditions were most unfavorable all week.

## INTERCOLONIAL COAL MINING CO., LTD.

The output of the Intercolonial Coal Mining Company, Westville, N.S., for 1908, was 305,913 tons, as compared with 307,844 tons in 1907, a loss of 1,931 tons. Disposals for 1908 and 1907 were as follows:—

|                        | 1908.<br>Tons. | 1907.<br>Tons. |
|------------------------|----------------|----------------|
| Water sales .....      | 45,292 00-20   | 65,876 10-20   |
| Rail sales .....       | 191,300 06-20  | 191,866 16-20  |
| Land sales .....       | 7,857 07-20    | 7,423 16-20    |
| Consumption .....      | 28,563 07-20   | 28,368 18-20   |
| Coke ovens .....       | 6,581 00-20    | 14,227 00-20   |
| Brick plant, etc. .... | 935 00-20      | 1,637 00-20    |

A considerable quantity of small coal was placed on bank, due to the fact that there was no market for that grade, the iron works of the province being very dull. The importation of American bituminous coal into the Quebec market in 1908 reached figures which are a decided menace to the coal interests of the Maritime Provinces.

As regards 1909, it is anticipated that the output will be about the same as that of last year, and disposals will likely show up about the same figures.

## THE CONSOLIDATED MINING & SMELTING COMPANY OF CANADA, LIMITED.

Smelter production for twelve months ending December 31, 1908:—

|              | Quantity.       | Gross Value. | Per cent. |
|--------------|-----------------|--------------|-----------|
| Gold .....   | 116,314 oz.     | \$2,384,437  | 47.27     |
| Silver ..... | 2,100,457 oz.   | 1,102,846    | 21.86     |
| Copper ..... | 3,753,139 lbs.  | 506,460      | 10.04     |
| Lead .....   | 35,999,145 lbs. | 1,050,455    | 20.83     |

Total value .....\$5,044,198 100

Tons Smelted.

Lead furnaces ..... 51,022

Copper furnaces ..... 267,384

Total smelted ..... 318,406

## COBALT ORE SHIPMENTS.

Following are the weekly shipments from Cobalt camp, and those from January 1, 1909, to date:—

|                               | Week ending<br>Jan. 9. | Since<br>Jan. 1. |
|-------------------------------|------------------------|------------------|
|                               | Ore in lbs.            | Ore in lbs.      |
| Buffalo .....                 | 44,020                 | 44,020           |
| Coniagas .....                | 35,630                 | 109,690          |
| Cobalt Central .....          | 40,000                 | 40,000           |
| Chambers-Ferland .....        | 80,000                 | 80,000           |
| City of Cobalt .....          | .....                  | 63,090           |
| Kerr Lake .....               | .....                  | 61,000           |
| La Rose .....                 | 193,560                | 193,560          |
| McKinley-Darragh .....        | 44,020                 | 44,020           |
| Nipissing .....               | 127,500                | 385,710          |
| Nancy Helen .....             | 40,000                 | 40,000           |
| O'Brien .....                 | .....                  | 124,325          |
| Temiskaming & Hudson Bay .... | 80,000                 | 80,000           |
| Muggley Concentrator .....    | 72,900                 | 72,900           |

Ore shipments to date for 1909 are 1,164,725 lbs. or 582 tons.

The total shipments for the week ending January 9 were 777,850 lbs., or 388 tons.

## COBALT ORE SHIPMENTS.

Following are the weekly shipments from Cobalt camp, and those from January 1, 1909, to date:—

|                               | Week ending<br>Jan. 16. | Since<br>Jan. 1. |
|-------------------------------|-------------------------|------------------|
|                               | Ore in lbs.             | Ore in lbs.      |
| Buffalo .....                 | .....                   | 44,020           |
| Coniagas .....                | .....                   | 109,690          |
| Crown Reserve .....           | 120,000                 | 120,000          |
| Cobalt Central .....          | .....                   | 40,000           |
| Chambers-Ferland .....        | .....                   | 80,000           |
| City of Cobalt .....          | .....                   | 63,090           |
| Kerr Lake .....               | .....                   | 61 000           |
| La Rose .....                 | 336,890                 | 530,450          |
| McKinley-Darragh .....        | 61,560                  | 105,580          |
| Nova Scotia .....             | 360,000                 | 360,000          |
| Nipissing .....               | 85,262                  | 470,972          |
| Nancy Helen .....             | .....                   | 40,000           |
| O'Brien .....                 | 63,840                  | 188,165          |
| Trethewey .....               | 60,000                  | 60,000           |
| Temiskaming & Hudson Bay..... | .....                   | 80,000           |
| Muggley Con. ....             | .....                   | 72,000           |

Ore shipments to date for 1909 are 2,292,277 lbs., or 1,146 tons.

Nova Scotia Mine shipped to Denver; La Rose to Denver and Copper Cliff; Crown Reserve to Denver and Copper Cliff; O'Brien to Denver; Trethewey to Carnegie; Nipissing to Balbach; McKinley-Daragh to Denver.

The official list of Cobalt shipments for the year has been compiled as follows by Mr. A. A. Cole, of the T. & N. Railway:

|                                       | Tons.     |
|---------------------------------------|-----------|
| Buffalo .....                         | 536.90    |
| City of Cobalt .....                  | 761.04    |
| Chambers-Ferland .....                | 223.89    |
| Cobalt Lake .....                     | 225.97    |
| Coniagas .....                        | 610.25    |
| Cobalt Central .....                  | 276.79    |
| Crown Reserve .....                   | 657.35    |
| Cobalt Silver Queen .....             | 885.70    |
| Drummond .....                        | 1,161.38  |
| Foster .....                          | 191.20    |
| Kerr Lake .....                       | 660.24    |
| King Edward (Watts) .....             | 338.19    |
| La Rose .....                         | 4,843.17  |
| McKinley-Darragh .....                | 1,808.39  |
| Nipissing .....                       | 3,571.96  |
| Nova Scotia .....                     | 237.95    |
| Nancy Helen .....                     | 201.32    |
| O'Brien .....                         | 3,459.51  |
| Peterson Lake (Little Nipissing)..... | 40.67     |
| Provincial .....                      | 75.84     |
| Right of Way .....                    | 750.04    |
| Silver Bar .....                      | .58       |
| Silver Cliff .....                    | 160.44    |
| Silver Leaf .....                     | 197.03    |
| Temiskaming .....                     | 795.20    |
| Temiskaming & Hudson Bay .....        | 1,094.23  |
| Townsite .....                        | 177.71    |
| Trethewey .....                       | 1,408.79  |
| Victoria .....                        | .47       |
| Casey Cobalt .....                    | 10.00     |
| Total .....                           | 25,362.20 |

## BRITISH COLUMBIA ORE SHIPMENTS.

## Week Ending January 9th.

Nelson, Jan. 9.—The extreme cold spell has interfered with the mines in the Boundary, and all the properties have been forced to close down until the weather moderates. The ore shipments for the past week and year to date are as follows:—

| Boundary—         | Tons.  |
|-------------------|--------|
| Granby .....      | 22,782 |
| Snowshoe .....    | 3,586  |
| Mother Lode ..... | 9,828  |
| Oro Denoro .....  | 340    |
| Sally .....       | 21     |

Total ..... 36,557

| Roseland—                   | Tons. |
|-----------------------------|-------|
| Centre Star .....           | 3,186 |
| Le Roi .....                | 959   |
| Le Roi No. 2 .....          | 500   |
| Josie Concentrates .....    | 84    |
| Le Roi No. 2 (milled) ..... | 260   |

Total ..... 4,989

| Slocan Kootenay— | Tons. |
|------------------|-------|
| Total .....      | 3,760 |

Total shipments for week and year to date are 45,306 tons.

The smelter receipts for the week are:—

|                          | Tons.  |
|--------------------------|--------|
| Granby .....             | 22,752 |
| Greenwood .....          | 10,168 |
| Northport (Le Roi) ..... | 1,183  |
| Trail .....              | 8,494  |

Total ..... 42,627

The following are the ore shipments for the week ending January 16th and year to date in tons:—

| Boundary—         | Week. | Year.  |
|-------------------|-------|--------|
| Granby .....      | 7,871 | 30,653 |
| Snowshoe .....    | 1,930 | 5,516  |
| Mother Lode ..... | 2,562 | 12,390 |
| Oro Denoro .....  | 290   | 630    |
| Other mines ..... | ....  | 21     |

Total ..... 12,653 49,210

| Roseland—                   |      |       |
|-----------------------------|------|-------|
| Centre Star .....           | 386  | 3,572 |
| Le Roi .....                | 623  | 1,582 |
| Le Roi No. 2 .....          | 82   | 582   |
| Le Roi No. 2 (milled) ..... | 100  | 360   |
| Other mines .....           | .... | 84    |

Total ..... 1,191 6,180

| Slocan-Kootenay— |       |       |
|------------------|-------|-------|
| Total .....      | 1,640 | 5,400 |

The total shipments for the past week were 15,484 tons and for the year to date 60,790 tons.

Granby Smelter receipts, Grand Forks, B. C.:—

|             | Week. | Year.  |
|-------------|-------|--------|
| Total ..... | 7,871 | 30,653 |

B. C. Copper Co.'s receipts, Greenwood, B. C.:—

| Total ..... | 4,072 | 14,240 |
|-------------|-------|--------|

Consolidated Co.'s receipts, Trail, B.C.:—

| Total ..... | 1,333 | 9,827 |
|-------------|-------|-------|

Le Roi Smelter receipts, Northport, Wash.:—

| Le Roi .....      | 623 | 1,582 |
|-------------------|-----|-------|
| Other mines ..... | 272 | 496   |

Total ..... 895 2,078

The total smelter receipts for the various smelters for the past week were 14,171 tons, and for the year to date 56,798 tons.

For week ending January 9th La Rose shipped to Denver and Copper Cliff; Nipissing to the Balbach Smelting Works, Newark; Nancy Helen, Cobalt Central, and Buffalo to Copper Cliff; Chambers-Ferland, and T. & H. B. to Denver; Coniagas to Thorold; McKinley-Darragh, and Northern Concentrators to Perth Amboy.

## SILVER PRICES.

|                | 1909. | New York.<br>cents. | London.<br>pence. |
|----------------|-------|---------------------|-------------------|
| January 7..... | 51½   |                     | 23 13-16          |
| " 8.....       | 51¼   |                     | 23 11-16          |
| " 9.....       | 51½   |                     | 23¾               |
| " 11.....      | 52⅝   |                     | 24 15-16          |
| " 12.....      | 52½   |                     | 24 3-16           |
| " 13.....      | 52⅝   |                     | 24¼               |
| " 14.....      | 52⅝   |                     | 24                |
| " 15.....      | 52⅝   |                     | 24⅞               |
| " 16.....      | 52⅝   |                     | 24 5-16           |
| " 18.....      | 52⅝   |                     | 24⅞               |
| " 19.....      | 52⅝   |                     | 24⅞               |
| " 20.....      | 52    |                     | 23 15-16          |
| " 21.....      | 51⅝   |                     | 23 11-16          |
| " 22.....      | 51½   |                     | 23¾               |

## MARKET REPORTS.

January 22.—Connellsville coke, f.o.b., ovens:—

Furnace coke, prompt, \$1.60 to \$1.70.

Foundry coke, prompt, \$2 to \$2.15.

## Metals.

January 22.—Tin, Straits, 28 cents.

Copper, prime Lake, 14.25 cents.

Lake arsenical brands, 14 cents.

Electrolytic copper, 13.87½ cents.

Copper wire, 15.75 cents.

Lead, 4.17½ cents.

Spelter, 5.12½ cents.

Sheet zinc, 7.50 cents.

Antimony, Cookson's, 8.10 cents.

Aluminium, 24 cents.

Nickel, 40 to 47 cents.

Platinum, \$22.50 to \$23.50 per ounce.

Bismuth, \$1.75 per pound.

Quicksilver, \$44.50 per 75-lb. flask.

## MARKET NOTES.

A writer in the Wall Street Journal ascribes the recent advance in silver prices to a speculative market. Silverware manufacturers report goods in great demand. The arts require annually between 28,000,000 and 30,000,000 ounces. The requirement will therefore be extensive.

On the other hand, Cobalt alone produces 20,000,000 ounces yearly, and as silver is a by-product of copper and lead ores, it is difficult to restrict it.

The drop in prices from the high level of eighteen months ago has been about 20 cents per ounce. From this decline must be deducted the recent rise, and no great improvement can be expected for some time.

In spite of this opinion there is evident now a marked and sustained rise in the price of silver.



# JUDICIAL SALE

## OF THE MINING PROPERTIES OF THE LARDER LAKE PROPRIETARY GOLD FIELDS, LIMITED.

Pursuant to the Winding Up Order made by the High Court of Justice in the matter of the Larder Lake Proprietary Gold Fields, Limited, and in the matter of the Winding Up Act, being Chapter 144 of the Revised Statutes of Canada, 1906, and Amending Acts, and dated the 23rd day of October, 1908, and with the approbation of George Kappel, Esquire, K.C., Official Referee, sealed tenders marked "TENDER FOR LARDER LAKE PROPERTY" will be received, addressed to "OSLER WADE, 64 WELLINGTON STREET WEST, TORONTO," Liquidator of the above named Company, up to four o'clock in the afternoon of Monday, the 8th day of March, 1909, for the purchase of the following assets of the said Company, consisting of thirty-seven mining claims, situated in the Townships of Gauthier, McVittie, and McGarry, in the Larder Lake Mining Division, District of Nipissing and Province of Ontario, and certain miner's supplies and other effects, all of which are set forth and described in the parcels hereinafter mentioned:—

### PARCEL 1.

Group of four claims around Bear Creek, in the Township of McGarry. The survey numbers and recorded numbers of the said claims are respectively as follows:—

| Survey Number. | Recorded Number. | Survey Number. | Recorded Number. |
|----------------|------------------|----------------|------------------|
| L. M. 79       | 1937             | L. M. 80       | 1936             |
| L. M. 81       | 1943             | L. M. 82       | 1945             |

There is a camp on L. M. 79, comprising: A bunk house, 18x20 ft.; cook house, 18x20 ft.; blacksmith shop, 12x14 ft., and a clearing of several acres. Bear Creek runs through L. M. 79, and according to a survey and an engineer's report, the creek can be utilized on L. M. 79 to develop power. Complete plans and profile of the survey and the engineer's report have been filed with the Department of Mines.

### PARCEL 2.

Group of fourteen claims near Larder Lake, in Township of McGarry. The survey numbers and recorded numbers of the said claims are respectively as follows:—

| Survey Number. | Recorded Number. | Survey Number. | Recorded Number. |
|----------------|------------------|----------------|------------------|
| L. M. 83       | 1965             | L. M. 84       | 1960             |
| C. E. 31       | 2132             | C. E. 34       | 1889             |
| C. E. 33       | 1883             | C. E. 36       | 1885             |
| C. E. 37       | 1887             | H. F. 35       | 2201             |
| H. F. 37       | 2018             | H. F. 38       | 1949             |
| H. F. 39       | 1961             | H. F. 195      | 1888             |
| H. F. 196      | 1884             | H. F. 197      | 1886             |

Claims L. M. 84 and H. F. 35 are subject to claim C. E. 62 so far as it overlaps. There is a well-equipped camp on said claims which consists of: One frame mill, 40x49 ft., with 18 ft. walls, and a battery of five stamps; engine house, frame, 20x30, equipped with 25 hp. engine and 35 hp. boiler, and an eject forcing pump, three-inch discharge, fully connected; storehouse, 14x20; cook house, 20x30; office, 20x30; bunk house, 1½ storeys high, 20x28; stable, 15x22; blacksmith shop, equipped, 13x15; powder house, 12x18; a wharf, 16x35, and the goods and chattels of the Company, which consist of dynamite, tools, and other miners' supplies, all of which will be sold with the said claims. In the erection of the above-mentioned buildings the purchase of the machinery and plant and installation of same, and the purchase of said goods and chattels, there has been expended upon the said claims a large sum of money.

**TERMS OF SALE:** Tenders are invited for the purchase of the five parcels "en bloc." Tenders may also be made for the parcels separately, and in case the whole property can be sold more satisfactorily in parcels, such tenders may be accepted. A marked cheque for ten per cent. of the tender, payable to the order of the Liquidator, Osler Wade, must accompany, as a deposit, the tender or tenders from each person. If a tender is accepted, twenty-five per cent. thereof must be paid within two weeks and the balance within three months from time of acceptance. The highest or any tender not necessarily accepted. The assessment work not performed to be completed by the purchaser, and the purchaser to take such title as the Company now has. The other terms and conditions of sale may be seen on application to the undersigned, and each tender shall be subject to those terms and conditions. The tenders will be opened by the Official Referee, George Kappel, Esquire, K.C., at his offices, Home Life Building, Toronto, on Tuesday, the 9th day of March, at 4 p.m.

For further information apply to the undersigned.

Dated this 26th day of January, 1909.

*When answering Advertisements please mention THE CANADIAN MINING JOURNAL.*

### PARCEL 3.

Group of nine claims, situated around Tonnene and Bear Lakes, and close to Larder Lake. The survey numbers and recorded numbers are respectively as follows:—

| Survey Number. | Recorded Number. | Survey Number. | Recorded Number. |
|----------------|------------------|----------------|------------------|
| H. S. 101      | 2035             | H. S. 126      | 2028             |
| H. S. 102      | 2034             | H. S. 191      | 2031             |
| H. S. 104      | 2137             | L. M. 85       | 2217             |
| H. S. 123      | 2029             | L. M. 86       | 2218             |
| H. S. 124      | 2030             |                |                  |

### PARCEL 4.

Group of six claims, in the vicinity of Pancake Creek, close to Larder Lake, Township of McVittie. The survey numbers and recorded numbers of said claims are respectively as follows:—

| Survey Number. | Recorded Number. | Survey Number. | Recorded Number. |
|----------------|------------------|----------------|------------------|
| L. M. 50       | 2071             | L. M. 53       | 2486             |
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| L. M. 52       | 2453             | L. M. 55       | 2203             |

### PARCEL 5.

Group of four claims, near Fork Lake, Township of Gauthier. The survey numbers and recorded numbers of said claims are respectively as follows:—

| Survey Number. | Recorded Number. | Survey Number. | Recorded Number. |
|----------------|------------------|----------------|------------------|
| L. M. 45       | 2378             | L. M. 47       | 2377             |
| L. M. 46       | 2389             | L. M. 48       | 2391             |

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# Ontario's Mining Lands

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Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The allied metal, cobalt, is also found in Ontario in unsurpassed quantities.

The output of iron, copper, nickel, silver and cobalt in 1906 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

**HON. FRANK COCHRANE,**

Minister of Lands, Forests and Mines,  
**Toronto, Canada.**

# PROVINCE OF QUEBEC

The attention of Miners and Capitalists in the United States and Europe is invited to the

## Mineral Territory Open for Investment in the Province of Quebec

Gold, Silver, Copper, Iron, Asbestos, Mica, Plumbago, Phosphate, Chromic Iron, Galena, Etc. **Ornamental and Structural Materials in abundant variety.** The Mining Law gives absolute security to title and has been specially framed for the encouragement of mining

All mines belong to the Government of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

The Government grants PROSPECTING LICENSES for lands on which the mines belong to it, giving the holders of such license the first right to purchase the mines. In the case of lands where the surface only is sold, the owner of the surface may be expropriated if he refuses an amicable settlement.

The price of prospecting licenses is \$5.00 per hundred acres on surveyed lands and per square mile on unsurveyed lands. If the surface has already been sold, the price is only \$2.00. They are valid for three months and are renewable at the discretion of the Minister.

When mines are discovered, they can be bought or leased from the Government. The purchase price is as follows:—

On lands situate more than 20 miles from a railway in operation, \$10.00 per acre, and on lands situate less than 20 miles from such a railway, \$20.00 per acre:

Superficial products and building materials are sold \$2 and \$4 an acre according to the distance from rail road.

MINING CONCESSIONS are sold in entire lots in surveyed townships or in blocks of not less than 100 acres in unsurveyed territories.

Patents are obtained subject to the following conditions: The full price must be paid in cash; specimens must be produced and accompanied by an affidavit; a survey at the cost of the applicant must be made on unsurveyed

lands; work must be bona fide begun within two years and \$500.00 spent for each 100 acre concession.

MINING LICENSES, giving the right to work the mine and dispose of its products, are granted on payment of a fee of \$10.00 and a rent of \$1.00 per acre per annum. Such licenses are valid for one year and are renewable on payment of the fee and of the same rent. They may cover from 1 to 200 acres or one and the same person, and must be marked out on the ground by posts.

The description or designation must, however, be made to the satisfaction of the Minister.

Persons working mines must send in yearly reports of their operations to the Government.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which remarkable discoveries of minerals have already been made, and through which the new Transcontinental Railway will run.

The government has made special arrangements with MR. MILTON L. HERSEY, 171 St. James St. Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. Tariffs of assays can be obtained on application to him.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the province, and will supply maps, pamphlets, copies of the law, tariff of assays, etc., to all who apply for same.

Applications should be addressed to:

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# BRITISH COLUMBIA

## The Mineral Province of Canada

has produced to the end of 1906, \$68,721,103 of Placer Gold; \$41,015,697 of Lode Gold, \$25,586,008 of Silver; \$17,625,739 of Lead; \$35,546,578 of Copper; \$79,334,798 of Coal and Coke; and \$5,813,799 of Other Minerals; or a total of **\$273,643,722**. The Mineral Production of the Province for 1906 was

# \$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was \$5,579,039 the Lead Output 52,408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

**HON. MINISTER OF MINES**

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## DOMINION



## OF CANADA

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**QUARTZ**—A person 18 years of age, or over, having discovered mineral in place may locate a claim 1,500 x 1,500 feet.

The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year, or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey made, and upon complying with other requirements, purchase the land at \$1 per acre.

The patent provides for the payment of a royalty of 2½ per cent. on the sales.

Placer mining claims generally are 100 feet square; entry fee \$5, renewable yearly.

An applicant may obtain two leases to dredge for gold of five miles each for a term of twenty years, renewable at the discretion of the Minister of the Interior.

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles. Rental \$10 per annum for each mile of river leased. Royalty at the rate of 2½ per cent. collected on the output after it exceeds \$10,000.

W. W. CORY, Deputy of the Minister of the Interior

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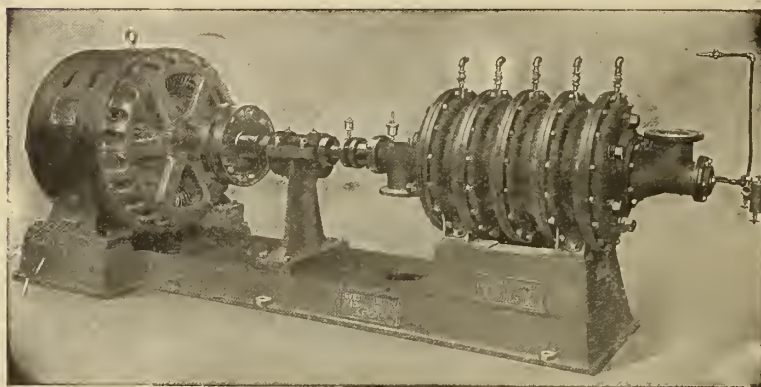
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will in almost all cases, excepting in very large water works, show a far greater economy than with steam-driven units. The power delivered at the pump shaft by a Westinghouse motor is at the same economical rate as that of the highly efficient engines in the power house, less the small electrical losses

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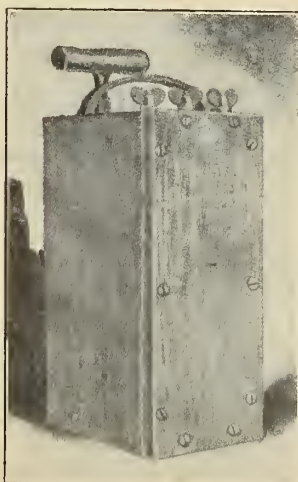
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Three Post Magneto Electric Blasting Machine

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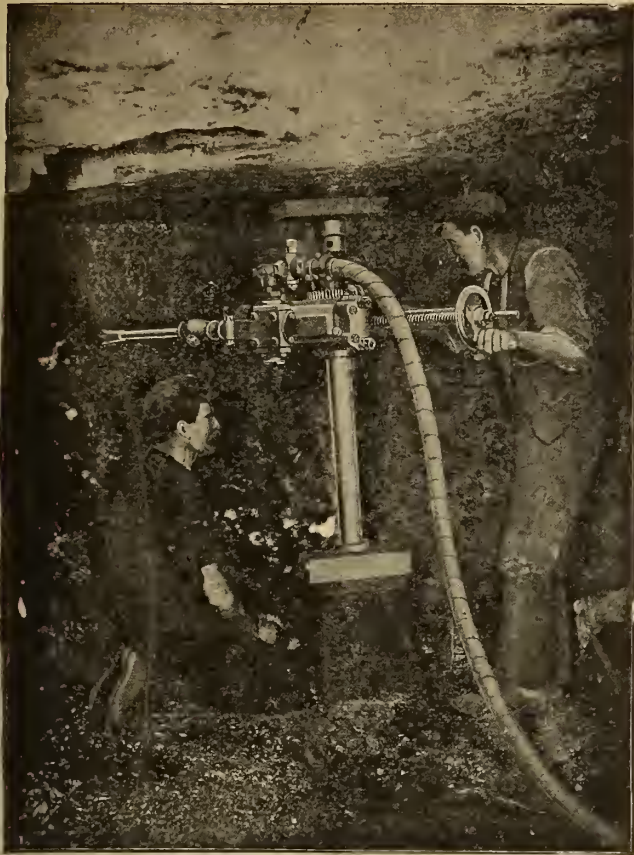
It always breaks cleanly to the bottom of the drill holes.  
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Holes at Floor Level or Roof Level or in any intermediate position in Coal or Dirt Band, &c.

Equally suitable for Holing and Shearing.

The Lightest Coal Cutter in the Market.

Nearly 700 Machines at work. 93 in use by one Canadian Company.

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Weight 22 lbs. Bores 6 ft. Deep.

Automatically Rotates the Drill Steel and lows out the Cuttings  
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Our aim has been to make an efficient, "fool proof" simple and durable machine, and we ask that you give us a chance to prove that we have succeeded.

**Try One with your other Drills and see the difference.**

BULLETIN 40

**The Canadian Cleveland Drill Co.**  
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### **A 5 Electric Rotary Drill**

for

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This machine  
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Bulletin X 16

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The Sullivan Chain Coal Mining Machine undercuts the entire face of the room or entry at one operation, without changing the position of the jacks, moving props, or lifting the machine by hand.

The Machine cuts on the bottom, leaves no uncut ribs or "sprags" at rear of cut, and is from 50 to 200 per cent. more efficient than the "breast" coal cutter.

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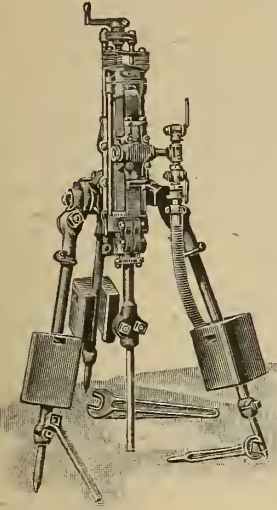
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## ROCK DRILLS

2¾ in. x 6¼ in., 3 in. x 6 in., 3½ in. x 6 in., 3¾ in. x 7¼ in., slightly used.

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5 in x 7 in., 6½ in. x 8 in., 7 in. x 10 in., 8 in. x 12 in. Double cylinder, single drum.

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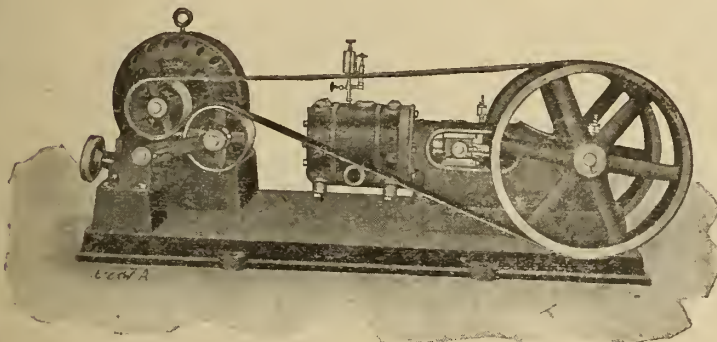
All standard sizes in stock.

## The A. R. Williams Machinery Co., Limited

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Manufacturers, Importers, and Dealers in all kinds of Engines, Boilers, Machinery and Supplies.

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Centre-Crank Type, Mounted on Cast-Iron Base.

This compressor is a portable self-contained machine of simple construction and compact form, made in small and medium sizes. It is suitable for any conditions where moderate quantities of air are required and where power is available, as for pneumatic tool service in manufacturing and industrial plants, stone yards, in erecting bridges and structural work, for small air lifts and in electric power houses for blowing out generators.

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These machines are built for vacuum pumps, for vacuum cleaning systems and other purposes, and for all pressures from one to one hundred pounds per square inch.

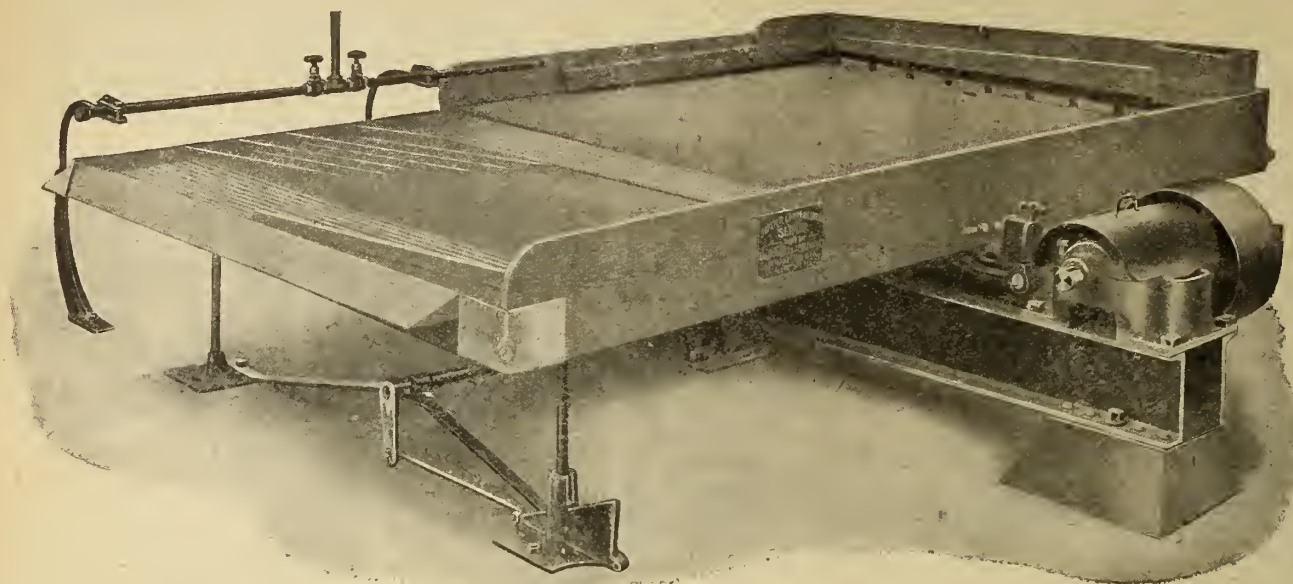
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A. LAIRD, General Manager.  
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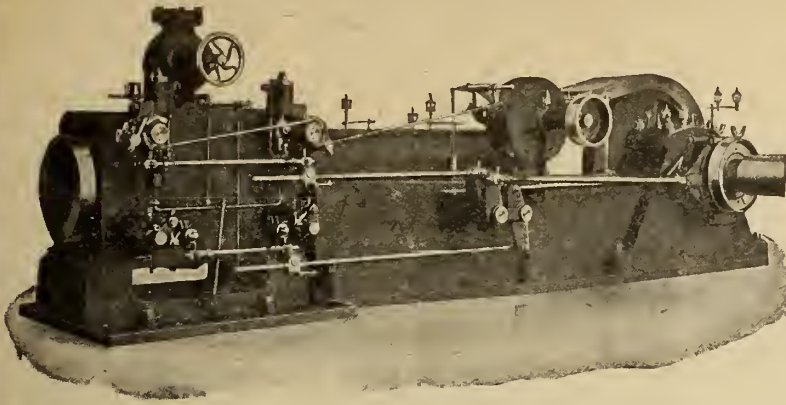
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Mining properties examined  
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Write for prices for  
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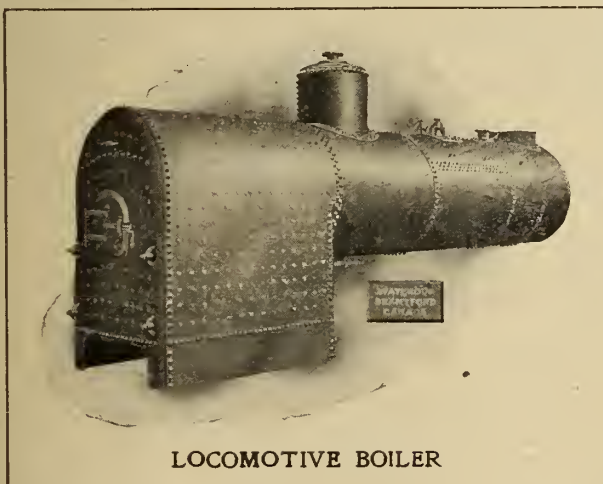
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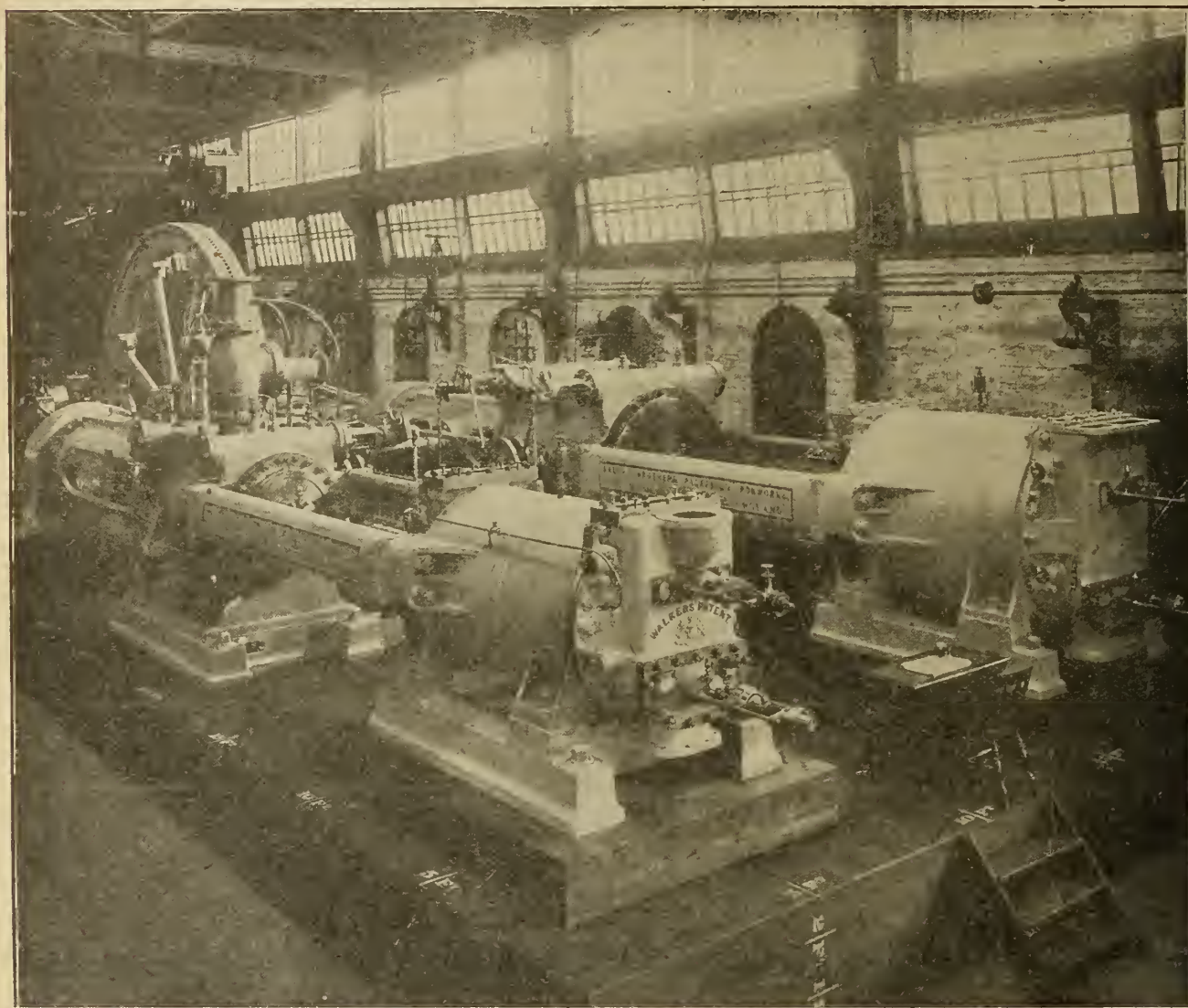
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is used for all the wearing parts. This steel is the supreme material for  
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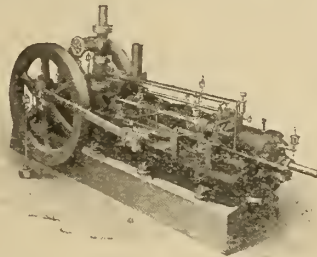
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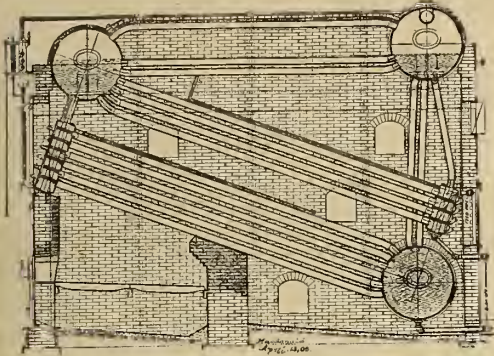
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Free expansion of tubes. Perfect water circulation. Dry or superheated steam. Half the usual number of handholes.

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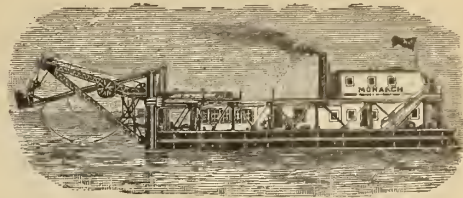
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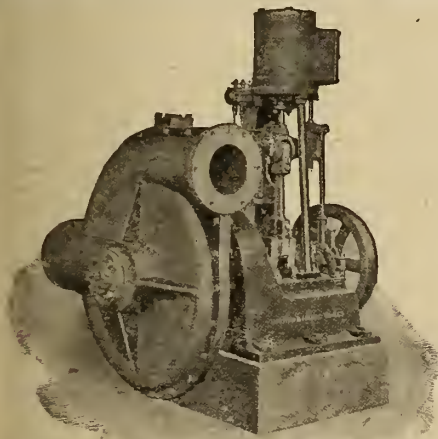
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Structural METAL WORK of all kinds**

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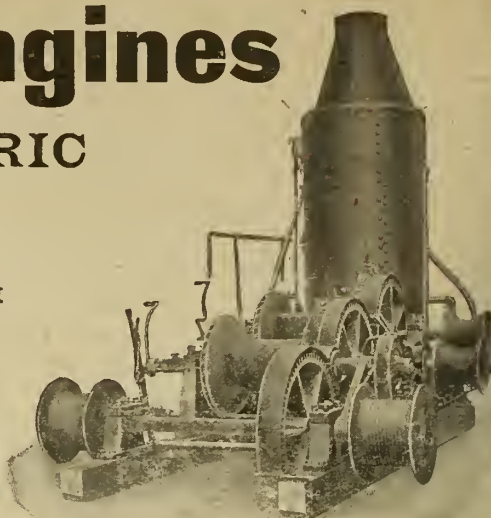
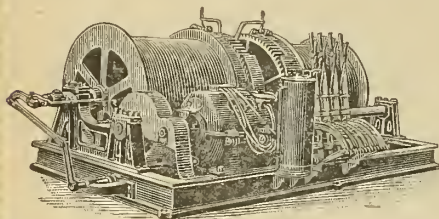
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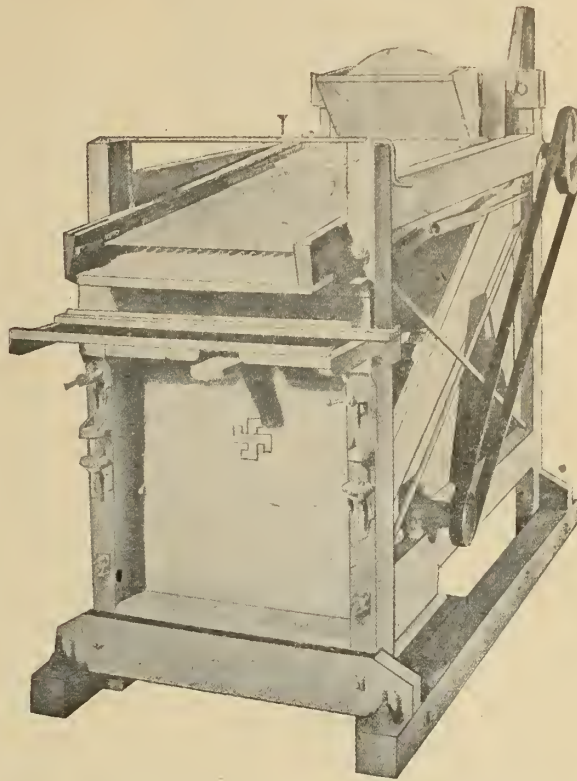
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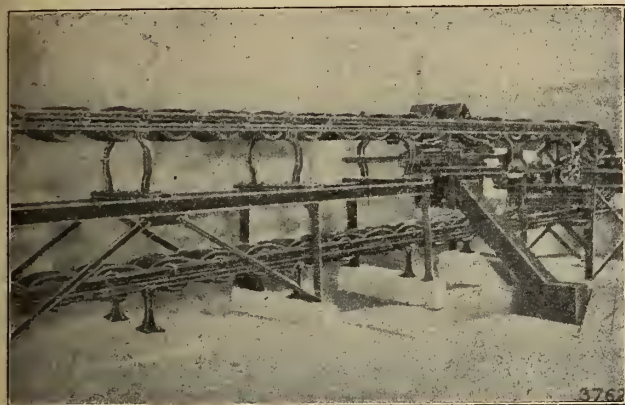
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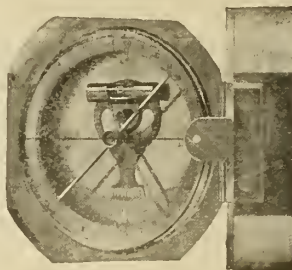
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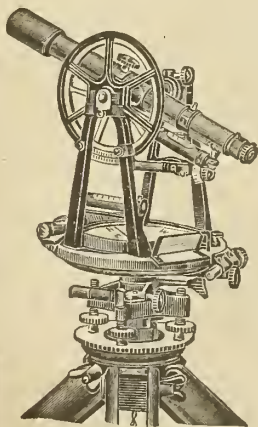
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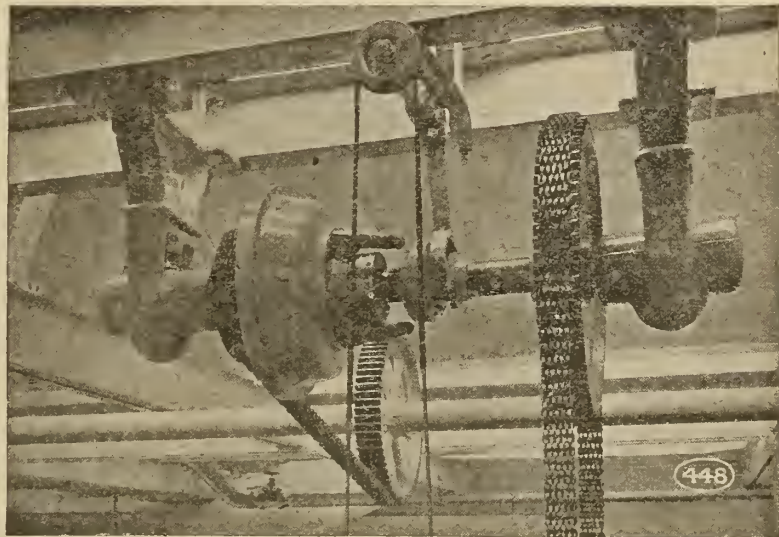
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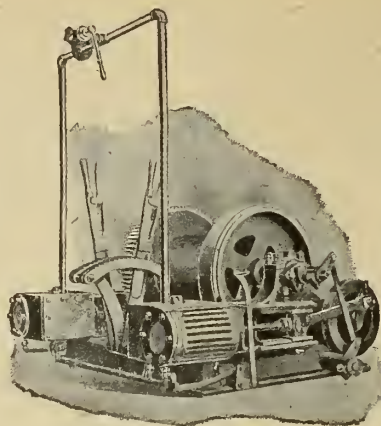
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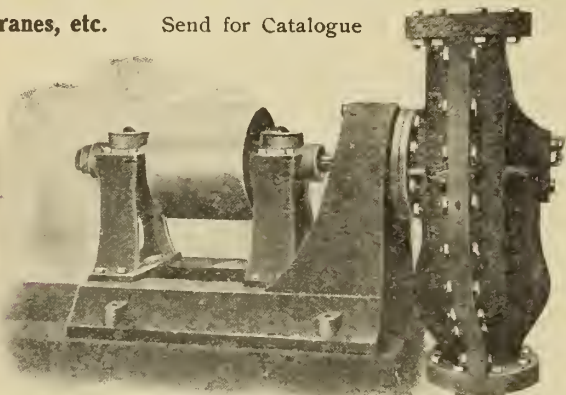
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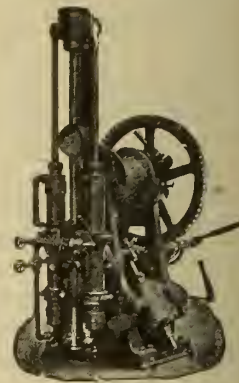
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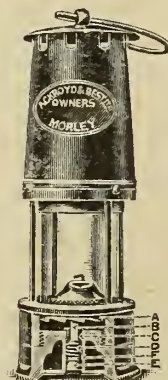
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, February 15, 1909

No. 4

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

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Published fortnightly by the

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Editor:

J. C. MURRAY, B.A., B.Sc.

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### CIRCULATION.

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**Natural Oil and Gas:** Eugene Coste, M.E., Toronto, Ont.

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### GOWGANDA.

**EDITOR'S NOTE.**—The following notes were hastily thrown together barely in time to appear in this number. Our readers, we trust, will overlook the obvious lack of coherence. In our issue of March 1 a much fuller article on Gowganda will appear.

Whatever discount must be allowed for the overstatements of promoters, there is no lack of evidence that Gowganda is a most promising field for the prospector. At present the tangible results of work done are small, but, in some cases, encouraging. On several properties camp-buildings have been erected. Supplies are being rushed in. The new winter route from Sellwood (Moose Mountain), the northern terminus of a branch line of the Canadian Northern Railway, to Gowganda Lake has been completed. Sellwood lies about 38 miles north of Sudbury from Toronto. A night's journey in comfortable cars lands one at Sellwood. Here travellers are transferred to sleighs. One and one-half days' drive, through a splendidly timbered country, ends at Gowganda Lake.

Fuller details of this new route will appear in a later issue of the Canadian Mining Journal. Our present purpose is merely to draw attention to the fact that there is a new passenger and freight road to Gowganda. The Charlton route has suffered badly from congestion of freight. Both roads will be taxed to their utmost to handle the traffic.

The townsite of Gowganda is just being surveyed. Naturally no lots have yet been sold. There have been however, several fictitious sales. The unfortunate purchasers will have to be content with snow.

Meanwhile, before the exact limits of the townsite are known, many buildings have been erected. There are several hotels in full working order. Two banks are completing large log structures, their business, meanwhile being conducted under canvas. Four or five lawyers, one doctor, and several surveyors have already hung out their signs. Accommodation for man and beast is being increased as rapidly as expert bushmen can pile, log on log. A saw mill is working overtime to supply the demand for boards for flooring and sheathing.

The town is situated on the northwest extremity of Gowganda Lake. Its population may be safely estimated at from three hundred to five hundred. The daily arrivals average not less than fifty. Some of these remain in Gowganda. Others are distributed through the various mining camps that are springing into existence in every direction. The lone prospector takes his tent and supplies into the woods.

In the general vicinity of Gowganda Lake, but a trifling amount of mine development has been performed.



The camp is in the first raw stage that succeeds discovery. The deepest shaft is down not more than twenty-five feet. On many of the older properties the principal work done has been the stripping of veins and the erection of bunk-houses.

Supplies are costly, but not inordinately so. Freight is delivered from the nearest points on the Temiscaming and Northern Ontario and the Canadian Northern, over the winter trails, at the rates of three dollars and two dollars per hundredweight respectively. Hay sells for about \$70 per ton in Gowganda. Bread retails at 25 cents per loaf. Other commodities bring corresponding prices.

Yet it is evident that very soon the cost of living and the prices of supplies and labor will be reduced. Proof of this is afforded by the statement that contracts have been let for shaft-sinking at rates only slightly higher than those obtaining in Cobalt.

On several mining properties visited by a representative of the Canadian Mining Journal, camp buildings had been erected. These rough, but comfortable, log structures are the first essential. Their builders are typical Canadian bushmen, French-Canadians mostly, hardy, resourceful men who appear to revel in such work. Under a competent foreman the speed with which these men construct is astonishing.

Gowganda has not yet a mining population. Indeed very few miners are to be seen, although the country is dotted with prospectors' cabins and tents. But miners are filtering in every day. Orders for machinery have already been placed and before spring there will be a considerable demand for skilled mine labor.

No one can fairly give an opinion of the district in its present condition. The country is covered with many feet of snow. Travel, except on the beaten trails, is almost impossible. Prospecting is out of the question. Of the veins discovered before the snow fell, several show high silver contents. Statements as to the horizontal extent of vein exposures cannot be checked until next summer. But it is by no means an exaggeration to say that the diabase areas of the district are well worth prospecting and that a few excellent discoveries have already been made. Indeed from a mining point of view the country offers many inducements, not only because of present showings but also because of the large future promises indicated by these showings.

So much for Gowganda itself. Gowganda's success or failure will depend very largely upon the methods of the men who exploit the region. If the district is proved and developed sanely and quietly, we believe that the chances are good that it will repay amply whatever expenditure is necessary to open it. If, on the other hand, promoters and brokers realize fortunes out of the sale of promotion stock before development is possible, then the drama of Cobalt's early days will be re-enacted.

Continual warnings are a weariness to writer and reader. They are necessary because the crop of dupes is never exhausted. We have no wish to protect the

gambler in stocks. Our desire is to guard the *bona fide* investor, particularly the investor whose means are limited. We advise strongly that all investors seek the counsel of disinterested mining engineers. And in all cases where it is at all possible the investor should visit the mining property himself. It is no longer a matter of great difficulty to reach the new mining districts of Ontario and a journey of this sort is worth taking on its own merits.

Among the most vivid impressions that Gowganda makes upon the visitor are those of restless energy, a shrewd sense of commercial opportunities, and, especially in the mining camps, unlimited hospitality. Whilst on the streets of our cities a man may die of hunger, in Gowganda no one need go without a meal. As a contrast to this milk of human kindness, a teamster will calmly ask you ten dollars for an hour's drive.

The pioneer spirit of Canadians is exemplified in the amazing speed with which a well-equipped winter road, through 70 miles of heavily wooded country, has been finished. Work was begun in the second week of January, 1909. The road was pushed through to Gowganda before February 1st.

Gowganda may be but one section of a silver-bearing region extending far towards the west. Here is inspiration for the prospector. Gowganda may become a producer of wealth or it may prove the graveyard of hopes and reputations. It is now a realm of probabilities. The thoughtful will take pains to inform themselves at first-hand.

#### A NEW BUILDING FOR THE KINGSTON SCHOOL OF MINING.

The Kingston School of Mining is asking the Government of Ontario to provide the money to erect a much needed building for the Departments of Chemistry, Mining and Metallurgy. The Government aids the school by a substantial annual grant for maintenance and equipment; and from time to time special sums have been voted by the Legislature for building purposes. By this means the Mining Laboratory was built in 1894 and in 1900 the two buildings for the departments of Mineralogy, Geology, Physics, and General Engineering.

In the sixteen years of its existence the School of Mining has grown rapidly, so that it now has 292 students taking engineering courses. This number would be very much larger if matriculation were not rigidly enforced as a condition of admission. As the overcrowding in some of the buildings had reached a critical stage, it was decided several years ago to keep down the numbers in this way. But even under these restrictions the departments referred to have become so crowded that it is impossible to carry on the work with the usual practical efficiency, or even with due regard to the



health of students and instructors. The Board of Governors has therefore decided to appeal to the Ontario Government for a grant of \$150,000, with which to erect a home for those departments that have done so much to develop the mineral industries of the province. A deputation of friends of the School of Mining will wait upon the Government at an early date. There will be no difficulty in getting a large and representative deputation. The work of the school is well known throughout the province, and doubtless the Government will see its way clear to return for the benefit of mining education a small part of the revenues received from mining lands.

#### TRAINING STATIONS FOR RESCUE WORK.

Upon more than one occasion we have alluded to the urgent need of Government Rescue Stations in the coal mining regions of Canada. A long series of calamities has aroused the United States authorities to the point of action. The technologic branch of the U. S. Geological Survey has in hand the establishing of Rescue Stations in all the larger coal mining districts of the United States. At Pittsburgh a fully-equipped station was formally opened in December, 1908. Others are being built and equipped as rapidly as possible.

At these stations squads of men from surrounding collieries will be trained on the use of breathing apparatus and in administering first aid to the injured. In this way hundreds of miners will become familiar with the use of the devices. Hence, in course of time no coal mine in the United States should be without the means of entering the mine workings immediately after an explosion and of fighting underground fires in a manner infinitely more effective than is now possible.

Apparatus, however, is not everything. Every miner should be given an opportunity of acquiring a working knowledge of the "breather." This is essential. The untrained man is worse than useless.

We regret that Canada has not, as a nation, taken the lead in this humane work. True, one Canadian company, the Dominion Coal Company, has been the pioneer for this hemisphere. But it is certainly the duty of the Federal Department of Mines to act, and that right rapidly.

We bespeak the attention of that Department and of all Canadian coal mining companies. No further lessons are needed. We can secure the means of saving lives and an almost incalculable amount of coal. Delay is dangerous—perhaps criminal.

#### BOOKS.

The progress of the mining and metallurgical sciences is a function of the dissemination of technical literature. Technical literature is distributed in five forms, periodicals, proceedings of societies, official geological reports, text books and trade catalogues. Periodicals embody what is most timely in current literature including much

that appears in the two proceeding classes along with original articles, discussion of live topics, current news, and much miscellaneous matter. Official geological reports stand as permanent sources of reference. Text books provide a means of education in any desired department of technical work. The modern catalogue is often a mine of special information especially useful to the working superintendent.

Thus the well-stored mind must draw from all these sources. Discretion is necessary in the choice of periodicals. So far as society proceedings and geological reports are concerned the average reader takes what he can get. But the choice of text books is a weighty matter. Book reviews are not seldom mere cursory notices of the volume's contents. But, in the main, they indicate to the reader the range, scope, style, and character of the book reviewed. In all periodicals the reviews should be carefully read. Moreover mining men of all classes should add steadily to their libraries. A knowledge of books is a most desirable qualification.

#### THE WESTERN BRANCH OF THE C. M. I.

There is evidence of healthy interest in the western branch of the Canadian Mining Institute. The fourth general meeting was held at Greenwood on January 25. Here a civic reception was tendered to the visiting members.

The first new business undertaken was the drafting of three resolutions. The first of these was a resolution congratulating Mr. R. W. Brock on his appointment as director of the Geological Survey; the second endorsed the application of the Nelson electric zinc smelter for aid from the Dominion Government; the third approved of the step taken by the British Columbia Government in assisting the Nelson enterprise.

On the second day of the meeting several papers were read.

Apparently the mining men of British Columbia are working together in a manner that should be followed by the other provinces. There has not yet been a general Ontario meeting. Nor have the mining men of Quebec foregathered. Nova Scotia, through her own Mining Society possesses the machinery for deliberation and action upon exigent issues. But Ontario and Quebec lack that spirit of unity that is so essential when emergencies arise.

Very often it is impossible or irrelevant to bring before the Canadian Mining Institute as a whole, matters that affect deeply the welfare of one province's mining industry. Often also, prompt action is necessary. The need of strong provincial organizations is obvious for more than one reason.

We are of the opinion that this matter should be taken up seriously at the next annual meeting.



## OUR VISIBLE SUPPLY OF BRICK.

M. B. Baker, School of Mining, Kingston.

The manufacture of clay products is probably the oldest industry on earth, for if we go back in thought to earliest man, we find him fashioning various articles both useful and ornamental from clay. This homely industry has been much ignored by scientific men in favor of other mineral industries that appeal more readily to the imagination, speculation, or cupidity; but the eye of the economist in all countries, is now being turned in the direction of this very old yet new industry.

In the selection of structural material we must admit that timber is already, or will very soon be, a thing of the past. Steel and iron, with various forms of clay products is now playing a most important role, but the days of cheap steel and iron will soon be over also. Even in this new American continent we can already estimate our iron ore reserves, and long before these are exhausted, the use of iron will be prohibitive, except for such purposes as will not be served by any other material. That being the case something must be found to take the place of timber and iron as structural building materials to a very large extent. That substitute will undoubtedly be clay products of various forms, including cement. Indeed this industry is already the most important mineral industry in almost every country in the world. Even in this our own Dominion, whose virgin timber is very largely untouched yet, by comparing the last mineral statistics of Ontario, whose mineral products are the most widely exploited and records kept most carefully, we can see that clay products including cement form one-quarter of the value of the whole mineral output, metallic and non-metal, and employ more men than the total metallic production.

Deposits of pure clay or kaolin, the results of normal rock decomposition, are practically unknown in Canada. Glaciation has removed our residual clays, and much of our rock materials as well, but has left in their stead enormous deposits of glacial material both sorted and unsorted. The sorted clays ensure an unlimited supply of structural material in almost every part of the country. My description of the clays will apply only to the eastern part of Canada, say east of Winnipeg. Whether it applies west of Winnipeg or not, I cannot say as I have had no work with clays west of that point. My work east of Winnipeg has extended over four years, two of which were spent in a study and report entitled "Clays and Clay Industry of Ontario for the Bureau of Mines." Report part II., 1906.

Four distinctly different clays are used in Eastern Canada in the manufacture clay products. I am not including the shales here, which are used exclusively in the manufacture of pressed brick, terra-cotta, sewer pipe, and paving brick; I refer only to the loose accumulations of clay, lying almost everywhere upon our glaciated rock surfaces. Those four clays are named Erie, Red Top, Leda, Saugeen. The Erie clay yields white goods, all the others yield red.

If a line be drawn roughly from Prescott on the St. Lawrence River in a northwesterly direction, through Perth, Ottawa, Arnprior, across the Ottawa River, it will mark approximately a former height-of-land, and the position of a great ice dam, which formed about the

middle of the glacial period. The waters west of this dam were all fresh, and drained through the Hudson River Valley of New York State. East of this dam the waters were salt, and the valleys of the St. Lawrence and Ottawa rivers were filled with backed-up salt water from the Atlantic to a depth estimated at 600 feet above the present water level. The great glacial moraines were being sorted by water and west of this line we find a clay called Erie clay, high in calcium carbonate, and carrying a few fossils of fresh water organisms. East of this line, however, a contemporaneous clay, looking in every respect like the Erie, but low in calcium carbonate, and carrying only fossils of marine organisms: this clay is called Leda clay.

The Erie clay is widespread in Ontario. In Geology of Canada, 1863, we find a note on the Erie clay, as follows: "The Erie clay, with few interruptions, runs along the north shore of Lake Erie from Long Point westward to the Detroit River, and appears to underlie the whole country between this part of the lake and the main body of Lake Huron. It is again found at Owen Sound, and occurs along the Nottawasaga River, and along the shores of Lake Ontario, and as far east as Brockville." Even at that time the Erie clay had been sufficiently studied to show that it was of great extent in Ontario; but during my examination of the clay deposits of the Province, I have found the Erie clay in every county west of the line mentioned above as extending from Prescott to Ottawa, showing that the whole of Western Ontario is covered by a mantle of Erie clay which varies in depth from one foot to 130 feet, and in many places is no doubt thicker still.

The Erie clay is of a deep blue color when wet, and of an ashy-gray color when dry. It is highly calcareous, as will be seen by the analysis given below, so much so that it effervesces freely when moistened with acid. Some specimens, especially from the more westerly parts of the Province, contain as much as 30 per cent. of carbonate of lime. Most of the Erie clays which are used in the manufacture of clay products do not exceed 18 per cent. lime, but even this is sufficient to counteract the effects of as much as 6 per cent. of ferric oxide and cause the brick to burn to ferrous compounds which give the white clay. All the white brick, white tile, hollow block, etc., made in Ontario, are from the Erie clay.

### Red Top Clay.

What I have here named the Red Top clay is not a separate formation, but is simply a weathered zone on the top of the Erie blue clay. It is given a new name because it is an extremely important formation in Ontario and so far as I am aware, it has not been described before. The Red Top clay is of a dark chocolate color when wet, and is found lying immediately on top of Erie clay wherever exposed. It burns to a rich red color, instead of a white or buff color as does the Erie clay from which it undoubtedly formed through weathering.

It was formerly thought that all the red brick, tile, etc., made in Ontario, were from the Saugeen clay, or from the various shales. But this is not the case. The greater part of the red brick made in the Province, is simply the product of this upper weathered band of the Erie blue clay. The weathering extends to a very un-



even line, in some places reaching 4 feet, while in others not over a foot. The deepest spots are along cracks or joints, or following roots of weeds, shrubs or trees.

Thus we see how irregular is the contact between this Red Top clay and the underlying Erie clay. This fact leads to a great deal of trouble for those brick makers using the Red Top clay, as they are constantly digging too deeply, thereby including some of the underlying Erie clay, which causes the resulting brick to be spotted by inclusions of the white-burning clay.

From the analyses given below, it will be noticed that the lime is reduced from over 15 per cent. in the case of the Erie clays, to about 2 to 4 per cent., in the Red-top, while the percentage of iron remains about the same. The percentage of magnesia is also reduced, and the loss on ignition is also lessened from roughly 18 per cent. to about 5 per cent. All these are the result of the weathering of the original Erie clay.

With these various losses there is naturally a corresponding increase in percentage of the insoluble residues in the resulting clay. Iron oxides are insoluble in these weak solutions, therefore the percentage of ferric oxides in the new clay is a little larger as a rule. All the free silica will remain undissolved, thereby increasing its percentage in the resulting clay. Similarly with the other insoluble ingredients.

I mentioned above that the Erie clay contains much calcium carbonate. In burning this Erie clay, the calcium carbonate is broken up by heat, and carbon dioxide gas is given off, which accounts for the large percentage of loss by ignition.

In every place where the Erie blue clay is found in the Province, and exposed on the surface, a band of the Red-top clay of some thickness was found as the first mantle, varying from a few inches to 4 feet, according to the ease with which the percolating solutions could attack the clay. And in every case upon digging through the Red-top clay, the underlying Erie clay was found. We can therefore see that our supply of red-burning clay in what is usually spoken of as "Old Ontario," is quite limited, and consists of a weathered belt rarely over three feet in thickness, and on steep gradients entirely wanting. An examination of the analyses of Erie clays given below will impress one with the close similarity in their composition, though taken from widely separated sections of the country; and when we consider the mechanical means by which these clays have been formed and collected, we are surprised that such a similarity should exist.

#### COMPARATIVE ANALYSES OF ERIE AND RED TOP CLAYS (LYING TOGETHER).

| Locality  | Clay    | Si O <sub>2</sub> | Al <sub>2</sub> O <sub>3</sub> | Fe <sub>2</sub> O <sub>3</sub> | Ca O  | MgO (Na <sub>2</sub> K <sub>2</sub> )O | Loss<br>by<br>Heat |
|-----------|---------|-------------------|--------------------------------|--------------------------------|-------|----------------------------------------|--------------------|
| Ridgetown | Erie    | 39.82             | 12.69                          | 4.67                           | 15.56 | 3.72                                   | 3.19               |
|           | Red Top | 65.06             | 14.15                          | 4.67                           | 2.36  | 2.18                                   | 4.14               |
| Exeter    | Erie    | 37.72             | 10.72                          | 3.51                           | 16.90 | 7.05                                   | 3.06               |
|           | Red Top | 63.56             | 19.91                          | 6.24                           | 1.91  | 2.42                                   | 3.85               |
| Stratford | Erie    | 46.16             | 13.76                          | 5.58                           | 15.74 | 3.78                                   | 2.70               |
|           | Red Top | 69.12             | 14.03                          | 4.81                           | 1.94  | 1.10                                   | 3.58               |
| Waterloo  | Erie    | 44.30             | 11.21                          | 4.05                           | 16.10 | 3.81                                   | 3.02               |
|           | Red Top | 68.06             | 14.18                          | 6.13                           | 1.34  | 1.98                                   | 3.42               |
| Preston   | Erie    | 51.30             | 9.80                           | 3.70                           | 13.63 | 3.82                                   | 3.91               |
|           | Red Top | 67.10             | 15.30                          | 4.80                           | 1.63  | 1.59                                   | 3.21               |
| Picton    | Erie    | 39.48             | 9.11                           | 3.71                           | 18.33 | 4.83                                   | 2.66               |
|           | Red Top | 59.48             | 14.80                          | 5.38                           | 4.60  | 3.32                                   | 4.70               |
| Beaverton | Erie    | 37.50             | 10.31                          | 3.59                           | 22.56 | 2.61                                   | 3.45               |
|           | Red Top | 59.96             | 19.58                          | 5.86                           | 2.62  | 2.30                                   | 4.05               |
| Peterboro | Erie    | 47.50             | 13.66                          | 4.44                           | 15.58 | 0.80                                   | 4.42               |
|           | Red Top | 64.44             | 15.26                          | 5.96                           | 3.65  | 1.78                                   | 5.72               |
| Renfrew   | Erie    | 50.06             | 14.58                          | 4.78                           | 14.00 | 3.47                                   | 4.10               |
|           | Red Top | 54.38             | 19.18                          | 7.30                           | 4.60  | 3.20                                   | 5.24               |
| Prescott  | Erie    | 49.85             | 13.10                          | 6.18                           | 14.32 | 3.13                                   | 4.14               |
|           | Red Top | 55.34             | 19.80                          | 7.62                           | 2.18  | 2.40                                   | 5.67               |

Ordinary meteoric waters on meeting the Erie blue clay dissolve much of the calcium carbonate, carrying it away in solution. The same reactions apply to Mg. CO<sub>3</sub> but to a lesser degree. Thus we have the resulting

weathered Red-top clay, much reduced in lime and magnesia and with a corresponding diminution in the amount of loss on ignition.

The iron which was present in the Erie clay is therefore still present in the Red-top clay, and being no longer counteracted by the high percentage of lime, it is able to burn to the ferric state, thereby coloring the brick red.

#### The Leda Clay.

Turning now to the eastern part of Canada we find that east of the line described above, the clay is entirely different from that west of the line. It is a stiff blue clay, which would be readily mistaken for Erie clay. Upon examination, however, it is found to be very different, e.g., the percentage of CaO is the most noteworthy point, it rarely exceeds 6 per cent., and since the percentage of iron oxide is about equal, the burning of this clay yields ferric compounds instead of ferrous ones, and the products are therefore red in color instead of white, as in the case of burned Erie clay. This Leda clay is contemporaneous in age with the Erie, but as has been pointed out above, it was laid in salt water instead of fresh. In some places it reaches a depth as great as that of the Erie clay, e.g., at Ottawa, where the foundations were being dug for the new geological museum, an exposure of blue Leda clay was very like the great depths of Erie clay in the west. I visited these excavations on two occasions, and the contractor told me that after digging twenty feet without finding rock bottom, he had bored 94 feet and still failed to find rock. The eastern part of Canada is therefore ensured an unlimited supply of red-burning clay, but lacks the white-burning clay.

I give below a few analysis of Leda clay, and a glance is sufficient to show that it differs essentially from the Erie clays of Western Ontario.

#### ANALYSES OF LEDA CLAY.\*

| Locality              | Clay | Si O <sub>2</sub> | Al <sub>2</sub> O <sub>3</sub> | Fe <sub>2</sub> O <sub>3</sub> | CaO  | MgO  | (Na <sub>2</sub> K <sub>2</sub> )O | SO <sub>3</sub> | Loss<br>by<br>Heat |
|-----------------------|------|-------------------|--------------------------------|--------------------------------|------|------|------------------------------------|-----------------|--------------------|
| Arnprior              | Leda | 57.98             | 19.00                          | 6.18                           | 3.78 | 3.82 | 5.68                               | 0.35            | 3.18               |
| 5 miles east Arnprior | Leda | 62.06             | 15.54                          | 5.70                           | 4.91 | 3.11 | 4.30                               | 0.14            | 4.01               |
| Ottawa East           | Leda | 58.54             | 17.02                          | 5.48                           | 6.36 | 2.22 | 5.13                               | 0.56            | 3.42               |
| Ottawa West           | Leda | 56.00             | 17.07                          | 8.27                           | 4.17 | 4.55 | 4.38                               | 0.59            | 4.89               |
| Hull                  | Leda | 52.86             | 17.42                          | 8.58                           | 3.69 | 3.37 | 4.97                               | 0.58            | 5.65               |

#### Saugeen Clay.

The last of our clays mentioned above, is the Saugeen. It lies unconformably upon both Erie and Leda clay, and in many places in the northern parts of Canada lies directly on the glaciated surface of the rocks. Starting at the St. Lawrence River somewhere about the mouth of the Ottawa, if we follow the river upwards to Casselman, Ottawa, Pembroke, then cut across country to Bracebridge, Paisley, Hepworth, Walkerton to Georgian Bay, then take the north shore of Lake Huron and Superior to the Soo and Fort William, then extend on to Dryden, Kenora, etc., we will have a rough line which will mark approximately the southern border of the great Saugeen clay belt.

This clay is composed of a great number of alternate bands of "fat" clay with bands of calcareous sand, or some places, even marl. The bands of clay and sand are rarely over three-quarters of an inch thick, but this relationship is repeated so many times that banks of Saugeen clay twenty feet thick are a common occurrence and present a very unique appearance. All the Saugeen clay seen in the Province lies north of this line mentioned above, and the farther north we go, the more abundant is this clay. I have seen it from Kenora to the St. Lawrence River, and for 100 miles north of Lake



Abitibi. The great "Clay Belt" of Northern Ontario, of which we have heard so much in recent years, is composed of this clay, and the layers of sand are the immediate cause of the sandy, loamy nature of the soil of this new country, which will soon be one of our greatest agricultural districts, now that railways are built and building into that district.

In age, I would place it at the close of the glacial period, for it appears to have been formed from the flow and ebb about the edge of the retreating or melting glacier, and each two bands, i.e., a band of clay with a band of sand, together represent the accumulation for one season. During the summer or warmer months, the increased flow of water carried the clay farther out, and the sand would be deposited closer to the ice margin. In the winter or colder months, when the flow of water was lessened, a layer of clay would be deposited over the sand, and this was repeated year after year, for many years, as shown by the great number of bands in this accumulation. This process would be gradually carried back in a northerly direction as the ice-front slowly retreated and in this way we find the deposits thicker and more widespread as we go north. The few stones found in this clay—and they are extremely scarce—would be

caused by small pieces of floating ice, dropping imprisoned stones upon melting.

The Saugeen clay yields a splendid red brick on burning. The percentage of  $\text{Fe}_2\text{O}_3$  is greater than that of  $\text{CaO}$  and a good red brick results. From analysis given below it is quite evident that this clay differs entirely from either the Erie or Leda clay.

| SAUGEEN CLAY.*       |                   |                                |                                |      |                                        |              |      |
|----------------------|-------------------|--------------------------------|--------------------------------|------|----------------------------------------|--------------|------|
| Locality             | Si O <sub>2</sub> | Al <sub>2</sub> O <sub>3</sub> | Fe <sub>2</sub> O <sub>3</sub> | Ca O | Mg O(Na <sub>2</sub> K <sub>2</sub> O) | Loss by Heat |      |
| Sault St. Marie..... | 64.30             | 15.45                          | 5.22                           | 3.42 | 2.02                                   | 5.23         | 3.89 |
| Spanish River .....  | 61.40             | 17.08                          | 6.34                           | 2.66 | 3.35                                   | 4.68         | 4.52 |
| Sudbury .....        | 63.20             | 15.75                          | 4.67                           | 4.32 | 2.73                                   | 4.71         | 4.35 |
| North Bay .....      | 64.08             | 17.21                          | 5.40                           | 2.34 | 2.75                                   | 4.91         | 3.90 |
| New Liskeard .....   | 58.30             | 15.70                          | 5.41                           | 5.10 | 3.27                                   | 4.77         | 7.30 |
| Sturgeon Falls ..... | 65.08             | 14.83                          | 3.17                           | 4.18 | 2.57                                   | 5.00         | 5.10 |
| Bracebridge .....    | 63.00             | 15.15                          | 6.28                           | 3.48 | 2.67                                   | 5.75         | 3.63 |
| Pembroke .....       | 62.30             | 16.51                          | 5.65                           | 3.16 | 2.68                                   | 4.91         | 3.60 |
| Casselman .....      | 61.20             | 16.40                          | 6.25                           | 3.10 | 3.25                                   | 4.26         | 4.94 |

To sum up, then, we see that Eastern Ontario, and Quebec, has an endless supply of red-burning Leda clay, and no white-burning clay. Western Ontario has a like supply of white-burning clay, with only a very little red-burning weathered Red-top clay. Northern Ontario and Quebec has an endless supply of red-burning Saugeen clay and little or no white-burning clay.

\*Note.—All these analyses were made at the Provincial Assay Office, Belleville, by Mr. A. G. Burrows, for Report of Bureau of Mines, 1906.

## PRESSURE IN THE FORMATION AND ALTERATION OF COAL.

By D. B. Dowling.

Very little attention has been given to the study of the history of coal beyond, perhaps, microscopical examinations, in which traces of spores and cells of various plants have been found, and these, associated with the plant remains or impressions in the associated rocks, have been the criteria for the general deduction that most of the coal had its origin in plant remains. The alteration of this material beyond the humification stage found in peat bogs has not been extensively studied, and the results appear to have been summed up in the statement that the transformation into coal was due to pressure and heat.

The general impression that there was a great loss of gases from the mass is shown in the following quotation from Prof. Gwillim's paper "Notes on the Life History of Coal Seams":—

"In the change from bituminous coals of, say, 25 or 30 per cent. volatile matter to 8 or 12 per cent. volatile matter, there must have been a great volume of gas disposed of. It may be possible some of this becomes a solid. In any case, what becomes of the volatile matter of a coal formation carrying in the aggregate 100 feet of coal?"

"A reduction of volatile matter from 25 to 10 per cent. would mean, in such a case, 15 million tons of gas per square mile, which, figured out in volume, would be as astonishing a loss as natural gas is as a find."

This conception is based upon the experiments of heating coal in the laboratory, when the change in composition is shown by the different amounts of gas given off under atmospheric pressure. But what would happen were the coal heated under great pressure?

A probable solution is given in recent experiments

on peat, which indicate not a wasteful production of gas, but a rearrangement, in which water is the principal by-product. The first experiments—which are continued to the present day—were confined to the drying of the raw material.

Subsequently an attempt was made to improve the heat value by carbonizing or charring. This produced a better fuel, but much of the volatile combustible matter was driven off, and the attempt to make fuel out of the peat necessitated the waste of gas specified in the paragraph quoted.

A later investigator, Dr. Ekenberg, added pressure to the wet mass during the charring process, and he claims that by this process there is no loss of gas, and attributes the charring or blackening results to a chemical change by which water is liberated, and hydrocarbon compounds formed containing more carbon as the pressure and temperature are increased. Under temperatures from 150 to 250 degrees Centigrade, and pressures to prevent the formation of steam, a product was obtained which, when dried and pressed, resembles coal, and has the characters found in lignite and bituminous coals.

That there was no gas evolved in this process seems at first sight unusual, but it appears to be a fact, deduced from the chemical analysis of peat, such as some of the Swedish ones—for example, one having the following composition:—

|                |      |
|----------------|------|
| Carbon .....   | 41.8 |
| Hydrogen ..... | 7.3  |
| Nitrogen ..... | 0.8  |
| Oxygen .....   | 46.9 |
| Ash .....      | 3.1  |

100.0



Supposing the above to represent 100 lbs., we add more peat until we have 61.9 lbs. of carbon, then the mass will eventually contain the following constituents in a mass of 147.8 lbs.:—

|                    |       |
|--------------------|-------|
| Carbon . . . . .   | 61.9  |
| Hydrogen . . . . . | 10.8  |
| Nitrogen . . . . . | 1.1   |
| Oxygen . . . . .   | 69.4  |
| Ash . . . . .      | 4.6   |
|                    | <hr/> |
|                    | 147.8 |

This, when treated so that the residue has 61.9 per cent. carbon, would mean that 47.8 lbs. were excluded. If this is water, then it represents hydrogen 5.3 and oxygen 42.4, which, deducted from the above, leaves a solid compound constituted as follows:—

|                    |      |
|--------------------|------|
| Carbon . . . . .   | 61.9 |
| Hydrogen . . . . . | 5.5  |
| Nitrogen . . . . . | 1.1  |
| Oxygen . . . . .   | 26.9 |
| Ash . . . . .      | 4.6  |

A briquet of peat-coal from similar peat is reported to yield by analysis the following composition:—

|                    |      |
|--------------------|------|
| Carbon . . . . .   | 61.9 |
| Hydrogen . . . . . | 6.8  |
| Nitrogen . . . . . | 1.2  |
| Oxygen . . . . .   | 27.1 |
| Ash . . . . .      | 3.0  |

If this were from the same peat, we would have to assume a slight formation of carbon monoxide gas to make the analysis exactly similar, but it is hardly necessary.

A higher temperature and pressure has been used by the operator, resulting in the formation of a coal richer in carbon to about 65.9 per cent. Expanding our analysis of peat to the higher percentage of carbon as before, and extracting water as before, we get for this carbon content the following theoretical analysis, parallel with the published analysis of the peat and briquet:—

| Theoretical.       |       | Peat.-Coal.        |       |
|--------------------|-------|--------------------|-------|
| Carbon . . . . .   | 65.9  | Carbon . . . . .   | 65.9  |
| Hydrogen . . . . . | 5.1   | Hydrogen . . . . . | 5.8   |
| Nitrogen . . . . . | 1.1   | Nitrogen . . . . . | 1.1   |
| Oxygen . . . . .   | 23.1  | Oxygen . . . . .   | 24.0  |
| Ash . . . . .      | 4.8   | Ash . . . . .      | 3.2   |
|                    | <hr/> |                    | <hr/> |
|                    | 100.0 |                    | 100.0 |

This peat-coal analysis shows a variation which could possibly be found among the briquets from the test, and seems to point to the truth of Dr. Ekenberg's statement that there was no gas formed. These briquets are certainly approaching the true coal stage; in fact, this last analysis could be almost duplicated in a coal from Gallup, New Mexico.

It is quite possible that to conduct these experiments with higher carbon content would entail very great pressures and temperatures, above the resistance of a crucible; but the question is, does this series of theoretical analyses obtained by the extraction of water lead us through the similar analyses we get from coals? One example might be calculated for a carbon content

of 82.41, which is found in a certain coal from West Virginia:—

|                    |        |
|--------------------|--------|
| Carbon . . . . .   | 82.40  |
| Hydrogen . . . . . | 4.30   |
| Nitrogen . . . . . | 1.04   |
| Oxygen . . . . .   | 5.20   |
| Ash . . . . .      | 5.06   |
|                    | <hr/>  |
|                    | 100.00 |

The theoretical composition of the peat—expanded as for the first, and taking out water for this carbon content—would be:—

|                    |        |
|--------------------|--------|
| Carbon . . . . .   | 82.41  |
| Hydrogen . . . . . | 3.69   |
| Nitrogen . . . . . | 1.40   |
| Oxygen . . . . .   | 6.5    |
| Ash . . . . .      | 6.0    |
|                    | <hr/>  |
|                    | 100.00 |

This, in theory, is readily seen to be a very similar product, so that although we cannot apply the great temperatures, we can assume that moderate temperatures with long lapse of time when subject to great pressures, may be the equivalent of the high temperatures and pressures indicated in the above experiments, and assume that like changes had occurred in nature in the formation of the coals. No thoroughly impermeable enclosure is provided for any of the seams, and possibly no coal has been formed without some loss of gas; but there appears to be no reason to suppose that very large quantities were thus lost. If, for instance, there had been no loss of gas from the lignites, it is conceivable that these coals would be easier to briquet, or coke. It also follows that compounds formed as the result of great pressure would be less stable than those requiring lower pressure. Thus, when released from load, the lignites would not so easily throw off gas as the bituminous. If we infer that the higher the carbon content the more liability to have gas in the mine, we would be right—up to a certain point. When through small losses of gas and the using up of the oxygen and hydrogen in the production of water, this tendency is checked in the mines in which the coal is anthracite, a rapidly declining amount of gas is given off.

It is evident, therefore, that there is some relation between the pressure under which the coal was formed and the stability of the resultant compound. Up to a certain point the stability decreases with the increased pressure, after which it increases.

The most unstable compounds would then be in the coals between the lignites and anthracites; the increase in stability being more rapid through the anthracitic coals. The greatest liability for gas would seem to be in the higher bituminous or high carbon bituminous coals.

There have been accidents in the mines in the working of this hard bituminous coal which would suggest that portions of the coal were at such a critical pressure stage that when released from load the unstable compound exhibited almost the character of an explosive. There are well authenticated examples of slight shocks, such as the stroke of a pick, or a light shot—producing a “blow out” of large dimensions, with disastrous results to life. This might be caused by a disruption of the hydro-carbon compounds, whereby a new coal compound was formed of a more stable nature; but with a loss of volatile matter or gas in sufficient volume to raise the pressure suddenly and furnish the mechan-



ical force necessary to dislodge other portions of coal. With the liberation of the gas and formation of a new coal compound the latter would not be compacted, but would blow out with the gas, as dust.

It is not at all certain that gas can be generated without the solid particles of coal being expelled along with it in the form of dust of different grades of fineness.

## A VISIT TO THE MINERAL DISTRICTS OF CANADA.

Paper Read Before the Institution of Mining and Metallurgy.

By William Freecheville, Past President, and Hugh F. Marriott, Member of Council.

(Continued from last issue.)

From Moose Mountain we went on to the copper-nickel mines near Sudbury. We commenced there by inspecting the very fine smelting works at Copper Cliff, belonging to the Canadian Copper Co., a subsidiary of the powerful American corporation called the International Nickel Co., which, besides owning most of the producing mines at Sudbury, also owns the Orford Copper Works in New Jersey and a number of the principal nickel mines in New Caledonia, which latter, however, are not being worked at present.

The smelting works at Copper Cliff have quite recently been reorganized and brought up to date, and give the impression of embodying the best that money and present technical knowledge can produce. There are three large blast furnaces with a daily capacity of 500 tons each, and it was stated that about 1,000 tons of ore were being smelted per 24 hours.

Part of the ore is roasted in heaps, and then smelted with a certain amount of raw ore, forming a smelting mixture requiring only a small and occasional admixture of quartz or limestone. The consumption of coke is said to be about 10 or 11 per cent. We understood that not long ago an attempt was made to introduce pyritic smelting, but without success.

The ore smelted contained, we understood, about 6 per cent. copper and nickel, say roughly half of each, and was concentrated up to a 30 to 35 per cent. matte. The matte is tapped into ladles and taken to converters, where it is blown up to about 80 per cent.; this rich matte is sent to the Orford Copper Works in New Jersey for further treatment. The reasons were mentioned for stopping the bessemerizing at this point, one being that, if carried further, the issues by volatilization would be heavy, and the other that such a matte can be imported into the United States as raw material.

From the smelter, a short run on the railway belonging to the company took us to the Kreen Hill Mine, one of the important mines which are now supplying ore to the smelter. The Kreen Hill Mine, like the other important deposits in the district, is situated at the edge of an intrusive rock of the greenstone type called norite (quartz-hypersthene-gabbro).

The ore occurs as splashes and bunches of copper pyrites and nickeliferous pyrrhotite in the norite, and it is generally supposed that these ores were original constituents of the fluid magna out of which they separated on cooling. Granting that hypothesis, the appearance of the mine suggested very clearly that this mode of formation has been plentifully supplemented by secondary action, depositing the ore along slip-planes, cracks and fissures. The run of ore-bearing ground is said to have a width of about 200 feet, and, it is said, do not yet know what width they will ultimately find profitable to take out. Underground work is going on at two levels underneath the open-cut, which are served by an underlay shaft

which goes down in the footwall at an angle of about 60 degrees. An electric winder is used.

The ore broken in the mine is hand-sorted, hoisted to the top of the rock-house, crushed in jaw crushers, and then hand-picked as it travels on rubber belts. About 50 per cent. is said to be picked out, the waste averaging about 21½ per cent. of copper and nickel, and the ore which goes to the smelter about 6 per cent., which is made up of about 4 per cent. of nickel and 2 per cent. of copper. According to these figures, the ore as mined should contain about 4.25 per cent. of copper and nickel.

We walked for some little distance along the outcrop of the run of ore-bearing norite and were interested to see the rock smoothed by glacial action and showing a little gossan, but not so much as one would expect to see on the outcrop of such an ore body. The gossan showed no sign on the surface of either copper or nickel, and where it was being dug into, at only two spots was a little green carbonate of copper noticed.

As illustrating the importance of the Sudbury copper and nickel industry, it may be mentioned that, in 1907, 359,076 short tons of ore were smelted, and the shipments of matte contained 6,996 tons of copper and 10,095 tons of nickel.

From Sudbury we passed through the beautiful rugged scenery skirting the northern shores of Lake Superior, and leaving this great waterway at the grain ports of Fort William and Port Arthur, we passed out of Ontario and arrived at Winnipeg. This town is the centre of the agricultural area of the Dominion; its streets are extremely wide and well paved, and palatial offices and stores stand alongside of little tumble-down wooden structures which were put up when the town was first located.

The journey through Manitoba and Saskatchewan was a long vista of open prairie covered with farms, on which, for hundreds of miles, the wheat stood in stacks ready for the threshing machine. Leaving Winnipeg, the next halt was made on the borders of Alberta, at Medicine Hat, and it was here that we had our first introduction to the extensive occurrence of natural gas, which has done so much for this continent.

Mr. Eugene Coste, who has long been associated with the industry in Canada, was with us throughout the trip, and gave us very useful information on the occurrence and development of this phenomenon. His theories are at variance with those which have generally obtained as to the origin of mineral oil and natural gas. He contends that they are of igneous origin, and not, as has been hitherto supposed, due to vegetable and animal matter. The results of his experience and his successful practice are certainly strong arguments in favor of the views which he has set forth in detail in Canadian Mining Institute papers.

At Medicine Hat the Canadian Pacific Railway have



sunk a hole alongside the line to a depth of 1,050 feet to the main reservoir tapped. The capacity of the daily supply was 1,500,000 cubic feet, and, using 300,000 cubic feet per day, the pressure at the mouth of the hole was 550 pounds to the square inch. From this well they are now supplying for lighting and heating purposes, firing their boilers in the railway shops, and using the gas locally for all purposes where fuel is required.

Small high-pressure mains are laid alongside the line, and the gas is charged in the train cylinders direct for burning in the carriage lamps. We also inspected a hole that had just been compelled by Mr. Coste some distance from the above. This hole was put down about the same depth to strike the same gas-bearing stratum.

Gas was turned on to full blast into the free air for our edification. Coming through a small delivery pipe in volume amounting to 1,000,000 cubic feet in 23 hours, the roar is such that the drums of the cars are endangered unless tightly closed or protected by plugs. The gas was then lit, and produced a torchlike flame 50 feet into the air.

The method of sinking these holes is by cable drills; the casing follows the boring tools closely down until the gas reservoirs are struck. A smaller pipe is then lowered into the hole and the intervening space securely plugged with rubber packing near the bottom of the hole. The gas then be shut off to be used as required, and the pressure, when the flow of gas is arrested, in some cases reaches 1,000 pounds to the square inch. The life of a hole is a very indeterminate quantity, and the supply may give out in a matter of months or last for years.

From Medicine Hat we proceeded to Frank, and inspected the landslide which took place on the 29th of April, 1903, in which a portion of Turtle Mountain broke away from the summit and was carried across the intervening valley and up the opposite hillside, burying the river, the coal mine and part of the town of Frank en route.

The mountain consists of paleozoic limestone thrust over cretaceous shales. In the latter is a coal seam, the mining of which probably caused a weakening of the base of the afterwards displaced rock, and the presence of a fault plane and other natural causes combined to effect the dislodgment.

The extreme longitudinal limit of the slide was  $2\frac{1}{2}$  miles. The height of the peak of the mountain over the river bed was 3,000 feet, the upper part of the surface being at an angle of over 45 degrees, so that the impetus gained in the descent was immense.

The rock mass that broke away was over 400 feet thick, and measured half a mile square. After re-deposition it covered a square mile of area. Huge boulders were transported with apparently little detrition, and the smaller pieces, though showing many signs of impact one with another, presented sharp angular surfaces, as if occasioned by a fresh break. Several curious phenomena in connection with the adjoining town are worthy of note as assisting any theories on the great distance of transport of this rock; for instance, cases are quoted in which human beings were conveyed out of their houses for considerable distances comparatively unhurt.

The whole appearance of the phenomenon led us to the opinion that the transported rock had practically floated on a wave of highly compressed air to the position in which it was redeposited. This theory appeared the more justified when there were noted in various eruptions simulating the form of volcanoes which had been subsequently blown up through the mass of detritus by the imprisoned air below.

From Frank we proceeded into the coal country of the Rocky Mountains on the borders of Alberta and British Columbia. We inspected the surface plant of the International Coal and Coke Co., and the Hosmer Mines, and then continued to the town of Fernie and visited the works of the Crow's Nest Pass Co.

The coal-bearing series in this district are in the cretaceous formation, which lies directly on Devonian carboniferous limestone. The formation is traversed by longitudinal faults and tilted up by the earth movements, which have formed mountain ranges. The coal varies from lignite in the eastern or less disturbed part of the district, to hard steam coal in the centre and west of the range, where greater pressure has been exerted. The town of Fernie had been completely burned down by a forest fire a month before our visit, but wonderful progress had already been made with the work of rebuilding.

The next place visited was Moyie, on the banks of the picturesque lake of the same name. Here are situated the St. Eugene lead mines, which belong to the Consolidated Mining and Smelting Co. of Canada, the head office of which is at Toronto, and which also owns the Centre Star and War Eagle mines at Rossland, and the Trail smelter. The mineral vein exploited outcrops up the mountain to a height of 1,800 feet, and is opened to a depth of 750 feet below the lake level.

The lode formation is decidedly curious, in that there is a main lode, and a parallel lode or lodes, and curious branches or cross lodes, locally called "avenues," running between the two, which also carry ore and are very material contributors to the output. The ore is concentrated in a mill on the shore of the lake, very much on the usual lines, jigs being employed for the coarser sizes, Wilfley tables for the finer, and Frue vanners for the slimes. Several Callow shaking screens are in use, which are said to be giving satisfaction.

According to the information given, they are putting through from 500 to 600 tons of ore a day, and producing about 80 tons of concentrates containing 60 per cent. elad, and 25 ounces of silver per ton. The concentrates are shipped to the Trail smelter.

Enticed by the good values obtained by the company, some adventurers acquired from the Government the mining rights under the lake, and discarding the usual method of sinking caissons and tubbing, where water is concerned, they proceeded to build a two-compartment shaft on a staging constructed some distance from the shore, and added on their sections, sett by sett, depressing the shaft into the water by means of superincumbent weights. The shaft, when we saw it, had been firmly driven into the mud bottom; the next move in the operations has not yet been decided upon.

From Moyie we went by train and steamer along the Kootenay Lake to Nelson, thence by train to Trail, where we were conducted over the well-known smelter, where both lead and copper ores are treated. The copper furnaces are 22 or 23 feet long, and 40 inches wide, and put through from 500 to 600 tons a day each. The ores are mixed as much as possible, so as to give a smelting mixture, and but little flux has to be added. The charge carries about 40 per cent. of silica. The matte from the first smelting is granulated and roasted in O'Hara furnaces, sufficient sulphur being left to allow the material to agglomerate in Huntingdon Heberlein pots.

The lead ores are also roasted in O'Hara furnaces, and then treated in Huntingdon Heberlein pots, and smelted in a blast furnace. The lead is refined electrolytically by the Bells process, being cast as anodes in



suitable form, and being suspended in a bath of hydro-fluo-silicic acid. The lead is dissolved and re-deposited in pure lead sheets, and all impurities, including silver, fall to the bottom as a black slime. Lead thus obtained is 99.99 fine.

From the Trail smelter we went on to Rossland, where we divided into several parties and visited some of the principal mines, such as the Le Roi and the Centre Star.

At the Le Roi we were taken to the 1,650 foot level, and saw a good-looking bunch of ore, on which, however, as yet, not much length has been proved. It was understood that this point was somewhere about 300 feet from the Centre Star property, and that in that mine, at about the same level, a good body of ore extends nearly up to the boundary.

The ore produced at the Le Roi mine last year averaged 0.98 per cent. of copper, 0.29 ounces of gold, and 0.44 ounces of silver, equal to an average value of \$10.49 per ton. It appears that the main vein in the Le Roi became poor at a depth of about 900 feet, but that values have been found again on a parallel south vein below this depth.

In the Centre Star Mine the same experience seems to have been passed through, the main vein, on which there were two makes or shoots of ore, becoming impoverished in depth; but values have made again on the south vein, more or less opposite to and below the ore above.

The ore bodies, where we saw them in the Centre Star Mine, were of good size, one being about 250 feet long and about 25 feet wide. The country rock is grano-diorite, and the vein filling appears to be altered country rock carrying iron pyrites, both plain and magnetic, a little copper pyrites, and some silver and a little gold.

At Rossland we were entertained at a banquet given by the local members of the Canadian Mining Institute, the citizens of Rossland, and the Rossland Board of Trade.

From Rossland we proceeded to Greenwood, and visited the mine and smelter belonging to the B. C. Copper Co. The mine is on what is known as the Mother Lode, and is exploiting a large body of ore about 150 feet wide, having a known length of about 1,200 feet. The hanging wall is of greenstone and the foot wall limestone.

The ore appears to be altered greenstone, in which spots of iron pyrites with a little copper pyrites here and there occur. The value is said to run from 1.5 to 1.75 per cent. of copper and about \$1.50 in gold and silver.

That it should be possible to work commercially such an ore indicates the very favorable conditions that exist. The workings are partly opencast and partly underground, and no timbering is used, the ore being worked out in chambers, leaving intervening pillars. The ore is self-fluxing.

An output of about 1,600 tons a day is being made from the Mother Lode, and about 400 tons a day are obtained from other mines, so that the tonnage smelted amounts to about 2,000 tons a day. The smelter is situated about four miles from the mines. There are three furnaces 20 feet long by 4 feet wide, putting through a little over 600 tons a day each. About 12½ per cent. of coke is used, costing \$6.50 per ton. The matte runs from 45 to 50 per cent. of copper, and is bessemerized and the black copper shipped.

The next mine visited in the district was the Granby, which conducts one of the largest low-grade mining and smelting operations in the world. The plant is now being increased to treat 5,000 tons a day. The ore dips at about 40 degrees, and several drives are made on each level, from which the stopes are carried up at an artificial

angle to enable the material to be run into the trucks by gravity.

The operations here consist of blasting down the ore, which gravitates into the trucks and is drawn out of the mine by electric traction. It is then run on a down grade to the smelter, and, passing through jaw crushers, four of which deal with the entire output, it is mixed with coke and dumped straight into the furnaces.

The ore, which contains 1.5 to 1.75 per cent. copper and \$1.50 in gold and silver, is entirely self-fluxing, and it is due to this natural advantage that this extremely low grade is profitably worked.

The smelter is at present doing 3,500 tons a day. There are eight furnaces, 14 per cent. of coke being added to the charge. The resultant matte is 40 to 45 per cent.; the slag, which contains about 0.3 per cent. copper, carries 45 per cent. silica. The Bessemer process completes the operation necessary to turn out marketable copper.

An interesting detail with regard to the furnaces here was the system of charging; the trucks containing the various materials are run right into the furnace, there being auxiliary wheels on the upper part of the sides of the trucks, which engage with rails on the furnace walls. They say they mine the ore in the morning and send the copper away as 99 per cent. black copper in the evening, and although this may perhaps not be strictly accurate, it substantially illustrates the unusual simplicity and celerity of the operations.

We returned to Nelson, and were taken by steamer to the Bluebell Mine, which is a low-grade lead, zinc and silver proposition. There are three successive ore bodies which, from the shape of the stopes, appear to be in the nature of large lenses. Some fine specimens of reef gold were shown us as coming from Sheep Creek in the vicinity of Nelson.

From Nelson we proceeded to the coast via Revelstoke, passing through Vancouver without stopping, but going on direct by boat to Victoria, where we were most comfortably housed in the Empress Hotel, belonging to the Canadian Pacific Railway.

The day after our arrival we attended a meeting of the western branch of the Canadian Mining Institute in the Parliament Buildings, the meeting being preceded by short addresses of welcome by the Hon. Mr. McBride, Premier of British Columbia, and the Hon. Mr. Templeman, Minister of Mines in the Dominion Government. The chairman of the western branch, Mr. A. B. W. Hodges, then read an able and interesting paper on the Granby mines and smelter, of which large enterprise he is the general manager. The meeting was in every way a bright and successful one. In the afternoon we attended a garden party given by the Governor of the State.

We spent the next day in Victoria, and in the evening attended a reception given in the Parliament Buildings by the Premier, the Hon. Mr. McBride.

From Victoria we went on to Nanaimo to visit the coal mines there, and on the way our train was stopped a short time to enable us to take a hasty glance at the Tyee smelter, favorably situated on the seashore, with convenient wharf facilities. This smelter, which has one furnace with a daily capacity of 300 tons, is now dependent on custom ores, and at the time of our visit a cargo of copper ore from some new mines which are being opened out by a Japanese company on Charlotte Island was being smelted.

The chief coal properties on Vancouver Island are owned by Hon. James Dunsmuir, who is at present Governor. We did not, however, go to any of his mines, but inspected the surface plant of the Western Fuel Co. at Nanaimo, but did not go down the mine.



An interesting side excursion was made at the latter place to a branch of Nobel's dynamite works, which has a capacity of 500 cases a day.

We returned to Vancouver on September 25th, and, after having been shown round Stanley Park, which, except for California, has the largest trees in existence, a farewell luncheon was given us by an influential gathering of Vancouver citizens.

In the evening we left Vancouver at 5 o'clock and started on the homeward run to the east, halting the next evening at Banff, where we spent the following day, and had an opportunity of seeing the grand mountain scenery which surrounds this most beautiful spot, of bathing in the sulphurous waters of the hot springs, and of visiting the Bank Head Collieries near by, which are being worked by the Canadian Pacific Railway. This is an anthracite mine, and forms a northern extension of the coal country referred to at Fernie. A large proportion of the product is made into briquettes by mixing the fines with 9 per cent. coal tar pitch.

From Banff we continued east to Calgary, which is situated in the prairie country, within sight of the Rocky Mountain range. Here we were given a glimpse of the real Wild West in relation to the cattle-raising industry. Mr. P. Burns, whose names in foremost on the ranches of the West, had gathered together the champion riders among the cowboys, and we witnessed some remarkable feats of endurance in the struggle for mastery between these seasoned horsemen and the "outlaws," which name is given to the incorrigible buck-jumping horses. We were also given a realistic exhibition of the method of lassoing, throwing and securing wild steers by these same cowboys, and a fitting conclusion was put to an exciting entertainment by the unrehearsed effect of a liberated steer charging the assembled company, fortunately without serious results.

Thus our most instructive, entertaining and enjoyable trip came to an end. The majority of the members continued eastwards in the special train, while others branched off in various directions to their work or to visit other camps.

The impressions we received of Canada as a whole were most favorable, and this remark applies also to the country as a field for mining enterprise.

It appears to us the natural resources offer abundant opportunity for development, in which English capital might be profitably employed. Results in the past, it is true, have not been uniformly encouraging, but this was probably more due to the methods adopted than to an absence of conditions for profitable working.

American capital appears to have been more successful than English capital in Canadian mining, and it is not difficult to understand this when it is considered that one can get on the train at Montreal or Toronto in the evening and be in New York the next morning.

English capitalists would, we believe, stand a much better chance of securing some of the good things as they come along if, instead of waiting to have things brought to them in London, they had an agent or representative resident in Canada. New developments and discoveries are, in our opinion, sure to occur from time to time, and we think this prospect, together with the chances of participating in the development of already existing enterprises, should be sufficient inducement to English capital to give more attention to Canadian mining than hitherto.

We cannot conclude these notes without paying a very warm tribute of thanks and kindly feeling to our Canadian hosts and brother engineers for their great kindness and hospitality. They treated us well, made us welcome, and gave us a unique opportunity of obtaining a birds'eye view of the present state of the Canadian mining industry.

## MINE ACCOUNTING.

Written for the Canadian Mining Journal by John G. Grant, B.A.\*

### I.

I have been asked by the Canadian Mining Journal to write a series of articles dealing with the simpler phases of accountancy, showing their application more particularly to bookkeeping for mining companies.

In the effort to abbreviate and simplify my articles, some ideas which appear of considerable importance to my readers may be slurred over or entirely neglected. For this reason a careful and studious reading of these papers, accompanied by honest criticism, will be heartily welcomed, and such criticisms will receive careful attention and an answer either by letter or by inclusion in some succeeding article.

The great majority of enterprises to-day in Ontario, involving a considerable amount of capital, are incorporated under the provisions of the Ontario Companies Act. A good working knowledge of this Act is, therefore, almost, or quite, indispensable to the modern business man in this province. With this idea in mind, we will follow a company from its inception to the commencement of operations, through the Companies Act touching on the more important requisites. It must be noted that a statutory requirement is never a matter of choice, but a hard and fast rule, a transgression of which will always be accompanied by some penalty provided for by the Act.

In determining the amount of capital stock to be asked for in the petition reasonable care should be taken. A company with a huge capitalization, unless it can be shown that an enormous working capital is necessary, or the value of the properties to be purchased is very great, becomes a subject of natural suspicion in the minds of foreign and home investors. But, notwithstanding this fact, the capital must be large enough to provide for the purchase price of the property, the commissions on the sale of stock and still leave sufficient working capital to buy the necessary plant and develop the property until it is on a revenue earning basis. It is customary and conservative to set aside unsold a certain proportion of the capital stock as treasury stock by the sale of which the working capital can at any time when the need arises be supplemented. In the interval while it remains unsold no dividends will be paid on it, thus raising the average dividend on the other stock.

Having fixed on the amount for which the proposed company is to be capitalized, the Lieutenant-Governor, through the Provincial Secretary, is petitioned to grant letters patent. The petition must contain the proposed name of the company, the objects for forming the com-

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pany, the address of the proposed head office in Ontario, the amount of capital and number of shares, the name in full, calling and address of each of the applicants, of whom there must be at least five, and the names of at least three provisional directors. This petition must be accompanied by a memorandum of agreement showing the number of shares subscribed for by

each applicant following his own witnessed signature. Each petitioner must be a bona fide holder of shares mentioned in the memorandum of agreement. Accompanying the petition there must be a marked cheque payable to the Provincial Secretary, covering the amount of the fee for letters patent. A schedule of the rates charged at present is as follows:—

### SCHEDULE OF RATES.

| MINIMUM AMOUNT<br>OF PROPOSED<br>CAPITAL. |  | MAXIMUM AMOUNT<br>OF PROPOSED<br>CAPITAL. |  | FEES.    |            |                       |                           |     |
|-------------------------------------------|--|-------------------------------------------|--|----------|------------|-----------------------|---------------------------|-----|
| UP TO                                     |  | \$ 40,000                                 |  | \$100.00 |            |                       |                           |     |
| \$ 40,000                                 |  | 100,000                                   |  | 100.00   | AND \$1.00 | FOR EVERY \$ 1,000.00 | OR PART FROM \$ 40,000.00 | UP. |
| 100,000                                   |  | 1,000,000                                 |  | 160.00   | " 2.50     | " 10,000.00           | " " 100,000.00            | "   |
| 1,000,000                                 |  | UP                                        |  | 385.00   | " 2.50     | " 10,000.00           | " " 1,000,000.00          | "   |

After the company obtains the letters patent applied for, it is in a position to offer to the public for subscription its shares of capital stock. It has been found expedient in some cases to advertise the offering of such stock by means of publishing prospectuses in the newspapers or by pamphlets distributed through the mails. Too much care cannot be taken in the preparation of such advertisements. A prospectus must contain the names of the signers of the memorandum of agreement, with the number of shares subscribed for by each, the number of shares necessary to qualify as a director and provisions (if any) for their remuneration; the names, addresses, and calling of directors; the minimum subscription on which the directors may proceed to allotment; the amount payable on application and allotment for each share; the amount allotted at any previous time; the number of shares issued or to be issued as fully paid up which have been paid for other than by cash; the names and addresses of the vendors of the property to be operated by the company and the manner of payment for the property; the amount paid or payable as commission; the amount paid or to be paid for preliminary expenses; the promoters' remuneration; particulars as to any special contract entered into and the place where the contract is filed; the name and address of auditors; and the interest in the company held by directors. When the prospectus is published in a newspaper the first requirement re the subscribers to the memorandum of agreement may be omitted. All moneys resulting from such advertisements shall be held in trust until deposited in a chartered bank to be held there in trust until the company may commence business.

After the minimum subscription has been received a declaration must be filed with the Provincial Secretary

that shares have been allotted to an amount not less than the minimum subscription mentioned, and that every director has paid in cash a proportion equal to the proportion payable on application and allotment by other subscribers. The Provincial Secretary will then give the company a certificate entitling them to commence business.

At least one month after the certificate has been received, and not less than three months after, a general meeting must be held, at which a report certified by at least two directors shall be presented. This report must contain the total number of shares allotted as fully or partly paid up otherwise than in cash, and the consideration for such allotment; an abstract of receipts and payments on capital account and a statement of preliminary expenses; the names and addresses of the directors, auditors, manager, and secretary, and the particulars of any special contract requiring ratification or discussion. The statements relating to cash and capital account should be certified by the auditor and filed with the Provincial Secretary. A list showing the names of all shareholders' addresses, etc., and number of shares held by each should be accessible to any shareholder during the meeting.

To take care of all these transactions dealing with the capital stock certain books must be kept. One of these is a plain ruled book called the Minute Book, wherein are kept the minutes of the above-mentioned meeting and all subsequent meetings, both of directors and shareholders. In this book should be pasted a copy of the letters patent. Books ruled as below must be kept to record the names of all persons who are or have been shareholders, the address and calling of each shareholder, and the name, address and calling of each directors, with date of beginning and ending of his holding office as director:—

### LIST OF SHAREHOLDERS

| DATE | NAME | ADDRESS | CALLING | Folio |
|------|------|---------|---------|-------|
|      |      |         |         |       |



## List of Directors

| DATE OF ELECTION | NAME | ADDRESS | CALLING | DATE OF RETIREMENT |
|------------------|------|---------|---------|--------------------|
|                  |      |         |         |                    |
|                  |      |         |         |                    |
|                  |      |         |         |                    |
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|                  |      |         |         |                    |
|                  |      |         |         |                    |
|                  |      |         |         |                    |
|                  |      |         |         |                    |

A book must also be kept to record any transfers of shares taking place, as a transfer is not valid until entered in the books of the company. Below is a simple ruling for such a book:—

## REGISTER OF TRANSFERS

| Folio | NAME OF TRANSFEROR | DATE | SIGNATURE OF TRANSFEROR | AMOUNT OF STOCK | Folio | NAME OF TRANSFEREE | ADDRESS | CALLING | SIGNATURE OF TRANSFEREE |
|-------|--------------------|------|-------------------------|-----------------|-------|--------------------|---------|---------|-------------------------|
|       |                    |      |                         |                 |       |                    |         |         |                         |
|       |                    |      |                         |                 |       |                    |         |         |                         |
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|       |                    |      |                         |                 |       |                    |         |         |                         |
|       |                    |      |                         |                 |       |                    |         |         |                         |
|       |                    |      |                         |                 |       |                    |         |         |                         |
|       |                    |      |                         |                 |       |                    |         |         |                         |
|       |                    |      |                         |                 |       |                    |         |         |                         |

A Stock Ledger to show the number of shares held by each shareholder and the amount paid in and remaining unpaid by each is also required. The ruling of the Ledger is shown below:—

NAME \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
 CALLING \_\_\_\_\_

| DATE | PARTICULARS | NO OF Shares Acquired | FOLIO | NO OF SHARES TRANSFERRED | NO. OF SHARES HELD | CALLS |      |               |       |             |      |                |  |
|------|-------------|-----------------------|-------|--------------------------|--------------------|-------|------|---------------|-------|-------------|------|----------------|--|
|      |             |                       |       |                          |                    | DATE  | RATE | AMOUNT CALLED | FOLIO | AMOUNT PAID | DATE | BALANCE UNPAID |  |
|      |             |                       |       |                          |                    |       |      |               |       |             |      |                |  |
|      |             |                       |       |                          |                    |       |      |               |       |             |      |                |  |
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|      |             |                       |       |                          |                    |       |      |               |       |             |      |                |  |

To this Ledger are posted all entries from the List of Subscribers and the Register of Transfers, and all payments of cash on account of stock subscribed for and called. The headings of the different columns are sufficiently explanatory in themselves to make the entries quite simple.

These four books, with the Stock Certificate Book, must be kept in the head office of the company in Ontario.

The certificates of mining companies issuing shares at a discount must have printed on them in red ink "Not subject to call," or "Subject to call," as the case may be. The words "No personal liability" must

also appear on their seal. To issue shares at a discount a by-law must be passed and confirmed by a majority of the shareholders at a special meeting fixing the rate and conditions of the issue. Within twenty-four hours a copy, verified by affidavit of President and Secretary, must be sent to the Provincial Secretary by registered mail or fyled within five days in the office of the Provincial Secretary.

Returns must be made before Feb. 1 in every year, including particulars as follows, covering a period up to Dec. 31 next preceeding the date of the report. The returns shall include the name of the Company, the manner of incorporation, the board of directors ad-

dresses, etc., the date of the last annual meeting, the place of the head office, the amount of the capital and how divided, the number of shares subscribed for and allotted, the number of shares issued, fully paid for, other assets, the amount of calls, amount of shares forfeited, the rate of discount on sale of stock, whether a sworn copy of by-law providing for the sale of stock at a discount was sent to the provincial secretary and date of same; and, lastly, an alphabetical list of shareholders. A copy of this report shall be pasted up in the head office to be left until replaced by the next report. The report must be sworn to by the president and secretary. I give here a list of fees for filing this report together with one or two other fees which are to be paid.

|                                                                                  |        |
|----------------------------------------------------------------------------------|--------|
| Filing annual reports of a company with capital of up to \$50,000.....           | \$2.00 |
| Filing annual reports of a company with capital of \$50,000 to \$100,000.....    | 3.00   |
| Filing annual reports of a company with capital of \$100,000 to \$1,000,000..... | 5.00   |
| Filing annual reports of a company with capital of \$1,000,000 up.....           | 10.00  |
| Filing by-law providing for sale of stock at discount.....                       | 2.00   |
| Filing certificate to enable company to commence business . . . . .              | 25.00  |

In order to show more clearly the bookkeeping relating to the sale of stock we will assume that all calls have been made and paid and the cash received and transferred from the trust company to the bank.

A special case book recording the receipts or capital account should be kept, with two columns, one headed *cash received* and the other headed *discounts*. The sum of the cash and discounts opposite each name is posted to the proper account in the stock ledger into "amount paid" column, balancing the accounts. The total of the cash column is entered in the General Cash Book and from there posted to the credit of capital account. The total of the discount column is put into the proper accounts by means of the following journal entry:

Discounts on sale of stock, Dr.  
To capital account

"Discounts on the sale of stock" account is charged with the total discounts allowed and capital account is credited with a like amount. Capital account will thus be credited with the total subscribed and paid up stock. The debit to discount on the sale of stock account must not be confused with the ordinary business discounts, but must be kept separate. It may be treated in either of two ways. It may be included in preliminary expenses and written off over a period of years. But this is not necessary for as it will never become a realized loss unless the company goes into liquidation, it may be carried as an asset shown in the balance sheet as a deduction from the subscribed and paid up stock.

If the purchase price of the property was partly in cash and partly in paid up stock the following entries must be made—*property account* is charged with cash paid through the *General Cash Book*. *Property account* is also charged with the amount of stock transferred to the vendors and *capital account* credited with a like amount by means of the following journal entry:

Property account, Dr.  
To Capital Account

The bookkeeping we have already done gives us the following results. The stock ledger shows what stock is held and by whom and what is unpaid on the stock if any. The general ledger shows a debit to *property account* for the purchase price of the property; a debit to *discounts account* for the discounts allowed on the sale of stock, and a credit to *capital account* for the total amount of subscribed stock. The General Cash Book shows a debit balance for cash on hand and in bank.

We will let the banks stand as they are while I endeavor to show in my next article how transactions taking place at the mines are recorded and what books are necessary there.

While the main principles of the Ontario Companies Act are common to the several other Companies Acts throughout the Dominion there are certain points of difference which will receive due notice in a following article. There will also be shown the requirements necessary for an extra-provincial company to commence business in Ontario, etc., and for foreign companies to commence business in Canada.

(To be continued).

## SINKING OF WABANA SUBMARINE SLOPES.

By R. E. and A. R. Chambers.

Published as an advance paper of the Canadian Mining Institute.

In June, 1893, the first landing on Bell Island was made by one of the writers, accompanied by the Butlers of Topsail, Nfld., who then owned the property, for the purpose of examining the iron ore beds.

After a lunch of flatfish and fresh lobsters procured from a nearby fishing boat and cooked on heated stones on the beach, an examination of the outcrops was made.

It could be seen at a glance that the property was valuable. Fifteen years of continuous working have produced striking changes: Then, the north side of the island a forest of fir trees, requiring a compass to guide one; the south side dotted by scattered primitive farms; now, the smoke from many boilers providing steam for the vast machinery employed, the rattle of drills, the sharp exhaust of many engines, groups of

houses where live part of the 1,500 employees, attract the eye and ear, and replace the silent forest. The roar of loading ore, the many-toned whistles of steamers, the hum of moving cars are heard from the homes of the old settlers, part fishermen, part farmers.

Such is the change wrought by the working of the ore upon the island. Nor is the change confined to here. Sydney, a quiet town, the citizens exchanging kindly greetings on the sunny grass-grown streets, is now transformed to a bustling cosmopolitan city, overshadowed by the giant works of the greatest steel plant in Canada. Across the harbor a group of huge furnaces and machine shops encircled by a network of many miles of track, and surrounded by a busy town of 7,000 people, replace at Sydney Mines a former barren plain.



The ore deposits and plant on the land at Wabana have been fully described in previous articles, so that a further reference is not here necessary; but recent developments carried on under the direction of the writers, in connection with the submarine areas, have proven to have an important bearing on the size of this ore field, and point to changes greater than those above referred to.

It has been shown that the ore upon the land is but a fringe of the greater deposits beneath the sea. The fact of a quantity equalling the entire requirements of the Scotia furnaces having been steadily mined from the submarine areas during the last six months is good proof of the practicability of working the ore.

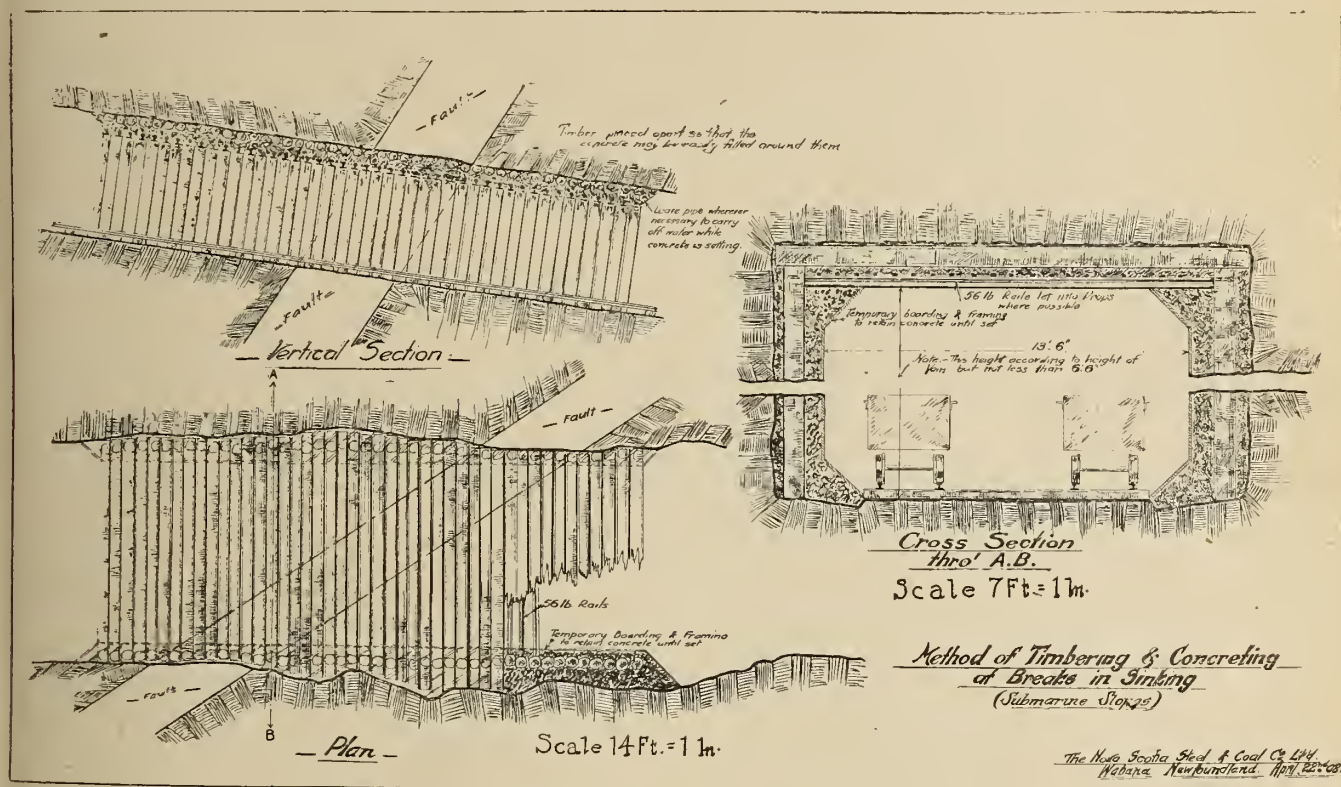
In view of the importance of these results, a short account of the developments may not be uninteresting.

#### Historical.

On the organization of the Dominion Iron & Steel Co. a sale was made by the Nova Scotia Steel & Coal

An agreement was made by which slopes could be driven by the Scotia Company through the submarine areas of the Dominion Company. The point selected was the continuation of the No. 2 Slope, already being worked on the upper bed. At the shore line here there was cover of 68 feet, which was greater than at any other point east or west. The dip of the vein being 8 degrees to the north, or direction in which the work progressed, made it possible to commence the work with the plant then installed until the practicability of the enterprise should be determined. It was known that at distances of about 250 and 1,000 feet respectively serious faults would be encountered, and it was not considered advisable to make any expenditure for plant until these should have been passed.

Work was commenced on May 21st, 1906. In August the first fault was encountered. Fortunately, although this dislocation amounted to an upthrow of 29 feet, with only 85 feet of strata intervening between the workings and the bottom of the ocean, the quantity



Co. to them of the bed of ore upon the land then being worked by the latter, known as the lower bed, reserving for themselves the upper bed on account of its superior quality. This sale included a submarine area of three square miles adjoining the shore. Subsequently outlying submarine areas were acquired by the Scotia people, which from the great depth of cover, it was thought would be quite workable over a large area. On account of the known persistence of the beds in this district these submarine areas would probably contain all the beds known to exist on the land.

Upon the submarine areas each company owns all the beds upon their respective claims, whereas on the land the lower bed is owned by one company and the upper bed by the other.

As the work progressed additional areas were procured, so that at the present time there are thirty-two square miles owned by the Scotia Company and five and half by the Dominion.

of water struck was trifling.

From a study of the rock structure upon the land it was pretty evident that this upthrow would be followed by a corresponding downthrow after driving about 800 feet, running northeast and southwest, approximately at right angles to the fault first encountered. It was consequently decided to continue the slope in the strata underlying the ore in order to maintain as uniform a grade as possible. The wisdom of this course was verified by encountering the ore beyond the second fault at the distance and height expected, and of greater thickness. This fault was more serious, containing 4 ft. of clayey decomposed rock, and an increased flow of water. The soft ground was handled by careful spiling and the water could easily be handled by two No. 6 Cameron pumps, the quantity not exceeding 80 gallons per minute.

Beyond this second fault no serious difficulties were encountered for a further distance of 1,800 feet, at



which point a downthrow fault of 26 feet was reached. The cover had increased to a total of 293 feet, and in consequence a greater feeling of security was felt in handling any difficulties which might occur. With the increased depth, however, was a corresponding increase in firmness, and the clay encountered in previous faults was not met here. The slope was continued in the strata overlying the ore, but with an increased grade for a distance of 400 feet, when ore was again entered with a normal thickness, and a normal dip of 12 per cent. The grade for the 400 feet was made 20 per cent., which by trimming will be subsequently reduced to 18 per cent. For this 400 feet the effects of the fault were felt in the increased tenderness of the roof, necessitating timbers being placed skin to skin, and in the amount of water dripping from above. The total quantity of water was, however, in no way formidable. After re-entering the ore bed beyond this fault, no difficulties have been encountered to the date of writing. The bed has the normal dip of about 12 per cent., the ore has a section of 9 feet, and the quality is fully maintained.

On entering the Scotia areas at a distance of nearly 4,000 feet from the shore the conditions are as favorable as could have been hoped for, and more so in that the quantity of water being handled is very small compared with what was expected.

The advances are as follows:—

Slope commenced May 21st, 1906. Distance driven to December 31st, 1906, 704.6 feet; distance driven to December 30th, 1907, 1,916.1 feet; distance driven to December 24th, 1908, 3,965 feet. The month of least advance was August, 1907, in passing first fault, or 42.5 feet. The month of greatest advance was November, 1908, or 247.81 feet. In the four weeks from the 16th of November to the 14th of December an advance was made of 270.1 feet. In the week ending December 7th, 1908, an advance was made of 72.5 feet. This gives a record of 11¼ feet per day for a month, and 12 feet 1 inch per day for a week. The size of excavation for this driving was 13 feet to 15 feet wide by 8 feet high.

A system of bonus payments for rapid advance greatly helped in attaining above results.\*

#### Plant.

**Boilers.**—The power used in sinking cannot be considered apart from the mining plant, as part of it is used for each purpose. The boiler plant consists of 5 batteries of Sterling water tube boilers of 234 h.p. each and 16 upright tubular boilers of 42 hp. each.

**Air Compressors.**—One Nordberg duplex compressor, cross compounded air and steam, jet condenser using fresh circulating water, direct connected to low pressure crosshead of the compressor; steam cylinders, 18—32x42; air cylinders, 19—29x42; capacity, 2,500 cubic feet of free air per minute. One Walker compressor of same type; steam cylinder, 22, 42x48; air cylinder, 23½, 38x48; capacity, 3,500 cubic feet of free air per minute; the exhaust steam is conducted to a surface condenser, using salt water from the sea for circulating water. One straightline Norwalk compressor, compound steam, compound air, with a jet condenser using fresh water; steam cylinder, 14—22x24; air cylinder, 14½—22x24; capacity, 1,200 cubic feet of free air per minute. The total capacity of air compressing plant is 7,200 feet of free air per minute.

\*Note.—Since above was written an advance of 74 ft. per week has been made.

**Hoisting Engines.**—In the early part of the work the hoisting was done by the engine connected with No. 2 Slope, being a 14x18 double cylinder, Flory single friction drum. As the work advanced it was necessary to supplement this by the addition of a 10x12 double cylinder, double-drum Lidgerwood hoist, placed at the mouth of a shaft sunk near the shore for this purpose, and by an 8¼x10 double cylinder single friction drum operated by compressed air, placed in a crosscut from the advancing slopes.

**Ventilating Plant.**—This consists of a 4-foot and two 3-foot Sturtevant fans. The 4-foot fan is direct connected to a vertical air-driven fan engine, and is located near the upper parts of the slopes, just at the bottom of the present workings of the No. 2 Mine, of which these slopes are a continuation. This fan is placed in the air course, and is operated exhausting. The two 3-foot fans are placed as described below.

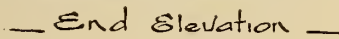
The intention was to sink the slope by double entry. In practice, however, it was found that the tendency was to place most importance upon the slope farthest advanced, with the result that it finally exceeded the secondary or ventilating slope by a distance of 2,900 feet. To provide for ventilating this long single slope recourse was had to spiral riveted galvanized iron pipe, connected with two Sturtevant blowers, with suitable by-pass connection, so that they could be used either as blowers or exhausters. One of these was placed at the upper end of the pipe, and the other reinforcing it about 1,000 feet farther down. The first pipe used was 15 inches inside diameter, and was found to be too small to give entirely satisfactory results. Below the lower fan 18-inch pipe was installed, which still continues to give a plentiful supply of air to the face of the slope. As the slope advances new lengths of pipe are added. On account of the blasting the pipe cannot be laid nearer than within 150 feet of the face, but no inconvenience whatever is felt in working at the face for this reason.

**Pumps.**—At the bottom of the old mine and near the top of the submarine slopes is an 18x8x24 duplex Jeansville pump of their pot valve anthracite pattern. This pump can be operated by either steam or air. The cylinders are so proportioned that it can be moved to a greater depth, where the head will be greater, if required. The water is delivered through a 6-inch pipe to a drainage tunnel running to the shore.

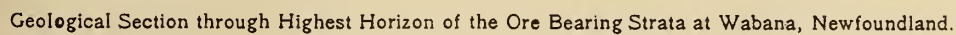
After passing the second fault the increased water was handled by two Knowles sinking pumps 12x6x13 and 10x5x13. These delivered the water to the shore direct, or to the lodgement of the Jeansville pump, as desired. These were afterwards replaced by a 12x5x12 duplex Jeansville anthracite pattern pump, subsequently to be moved to a greater depth. The working face was kept dry by two No. 6 Cameron pumps working alternately, and latterly by a No. 8 Cameron, the water not exceeding 50 gallons per minute.

**Dams.**—To protect No. 2 Mine from possible inundation sites for mine dams were constructed at a point situated vertically below high water mark. When approaching this point the face was narrowed to 6 feet, and then gradually widened again, forming a V. No reduction was made in the height. The sides, top and bottom were lined with concrete. A small pipe was placed in the roof as an outlet for air when pressure should come on the lower side of the dam, and capacious air and water pipes were built into the floor. Timbers to fill the openings were made of 10x10 pine



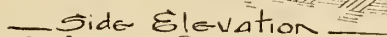
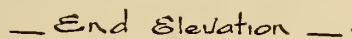


Scale -  $\frac{1}{8} = 1 \text{ ft}$









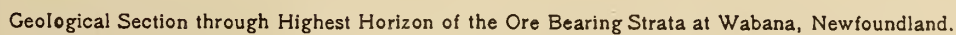
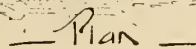
## ARRANGEMENT OF

IN SUBMARINE SLOPE

NEWFOUNDLAND

New Glasgow. Jan. 8<sup>th</sup> 09

Scale -  $\frac{1}{8} = 1 \frac{1}{2}$







tapering to 6x6 and piled at the mouth of the slope in the same position they would occupy in the dam, and carefully protected from the weather.

**Piping.**—The air line is 8 inches as far as the workings in No. 2 Mine and to the large Jeansville pump, and 5 inches for the rest of the submarine slope. The water discharging line is 6 inches, being double from the large pump to the surface.

**Testing Air Pipes.**—The air pipes of the sinking and working mines are periodically tested, as follows: All pipe ends are carefully closed as near to the drills as possible. A pressure gauge is connected to the section to be tested. The section is then filled from the mains, and the supply valve closed. The air in the line is then released until the gauge reads 50 lbs. The time is taken and the pressure allowed to drop by leakage until it reaches 40 lbs., when the time is taken. The loss in cubic feet of free air will be approximately half the volume of the pipe tested. This divided by the time will give the loss per minute. The amount of pipe in each section not being often changed, this can be easily kept track of. The conditions, with the exception of the time, will be practically constant. The pipe fitter is thus constantly familiar with the condition of his pipes. Corrections for temperature would be necessary for accurate results, but in practice are not needed.

**Cars.**—The cars used are of steel, of 30 cubic feet capacity, holding from 1.7 to 1.8 tons of ore, the gauge 2 feet.

**Tracks.**—The tracks are of 28 lb. rails, except near the face, where an 18 lb. rail is temporarily used.

**Protection from Runaways.**—Every tramming section of the slope is protected by a heavy swinging gate, the posts of which are securely hitched in the floor and roof and heavily braced to the walls. Each gate is operated by a boy.

The face is protected by two ordinary swinging Sampson posts placed from 50 to 100 feet back and moved alternately as the work progresses.

A safety switch is also placed a few hundred feet below the brow of the deckhead.

**Telephone System.**—Telephones are installed in the slopes, connecting through a central office with all parts of the works, the office and the houses of the manager and underground manager.

**Inspection.**—There is a daily inspection of cars, ropes, pulleys and all machinery.

#### Method of Working.

Three eight-hour shifts are worked. When the air is cleared of smoke from the last shot, the drillers and loaders proceed to the face. The drillers and their helpers begin to assemble their drills and columns, while the loaders employ themselves in throwing back the ore from the face. The drills, of which there are two on this shift, are then set up four feet from the face and about twenty inches from the rib or side, and each puts in five 12-foot centre cut holes, B 1, 2, 3, 4, 5, and C 1, 2, 3, 4, 5, respectively, completing the round in about 6 hours. The holes are blown out with compressed air when the shift is completed. After having cleared away the face for the drillers the loaders, six in number, clear off the track and run in a trip of three cars. They load up the ore that has been thrown up the slope by the previous blast, which sometimes is as much as 100 feet from the face. When the ore is reduced to a heap behind the drillers one car only is used, and the loaders relieve each other car about, three at a time. The loaders generally finish at the same time as the drillers. Forty to fifty tons is an average shift's work.

The blasters then load the holes drilled with 7 lbs. of 50 per cent. Acadia dynamite in each, tamping them securely with paper cartridges of clay prepared for the purpose. After the wires and blasting machinery are tested for strength and circuit the round is fired. If the work has been done correctly, the centre cut will be taken out as shown in the sketch, and the ore thrown well up the slope. Owing to the heavy burden on these holes they will be only about half shot out. A little high pressure air is turned on at the face immediately after the blast, and the exhaust fans described above speeded up. In the course of a short while the air at the face is quite clear, and while still a little warm, work can be resumed.

The next shift then begins, loaders clearing face as before.

The usual drillers now set their bars four feet back from the face and as close to the rib as possible, and drill holes A 1, 2, 3, 4, 5, and D 1, 2, 3, 4, 5, 12 feet deep. In addition to these two spare drills are set up in the cut and drill holes E 1, 2, 3, F 1, 2, 3, G 1, 2, 3, and H 1, 2, 3, respectively, 6 feet deep. As the extra drills do not come on the same shift each time, there are two spare drillers on each shift, and when not employed at this work they are kept busy repairing and advancing ventilating pipes, swinging Sampsons, etc., and other odd jobs.

The order of blasting is now more elaborate than on the previous shift, and on the care taken in this work greatly depends the advance to be gained.

They first load and fire first holes F 1, 2, 3, and G 1, 2, 3, 3 lbs. to a hole. Next they fire the old bottoms of holes B 1, 2, 3, 4, 5, and C 1, 2, 3, 4, 5, with 3 to 5 lbs. each, according to necessity. The third round is E 1, 2, 3, and H 1, 2, 3, 5 lbs. to a hole, and finally A 1, 2, 3, 4, 5, and D 1, 2, 3, 4, 5, are fired, 5 lbs. to a hole. This makes a total of about 200 lbs. of 50 per cent. dynamite to an advance of  $8\frac{1}{2}$  to 9 feet, according to the success of the work done.

The method of using short bars and setting up the drills on top of the ore heap was tried for some considerable time at first, but it was found that while saving a good deal of time in handling the ore, in the long run it did not pay.

The storage, thawing and distribution of the explosives for both the mines and the submarine slope is carried on at a central station, which comprises a small magazine, thawing house, with detached boiler-room, and a shed for testing detonators, located at convenient distances apart.

The thawing is carried on in a small stone building, brick lined and wood faced inside, with an air space between the brick and stone, and the building is provided with a large entry for the reception and disposal of the explosive. The heating system is the ordinary hot water system as used in dwellings. The radiators are placed in wooden boxes to prevent accidental contact of the explosive.

The various blasting crews, wiremen, thawer, magazine storekeeper and detonator tester are all under the supervision of an explosive inspector, who constantly inspects all operations connected with the use and disposal of all explosives, and who immediately reports to the underground manager any unusual occurrence, and, if possible, the cause of the same.

Credit is due to the following officials of the company at Wabana, as well as their subordinates generally:—

Frank Burrows, who succeeded one of the writers



as resident manager upon his taking up the designing of the permanent equipment for these slopes.

Laughlin McLean, who in the capacity of underground manager has been connected with the work from the beginning, and whose energy contributed greatly to the success.

John Cunningham, acting for the greater part of the time as mechanical superintendent, and for a short while David Fraser in the same capacity.

T. G. McKenzie, who is in charge of the surveys, and W. L. Hunter and E. Rees as draughtsmen.

#### Results.

As a result of the work above described it has been

proven that, as anticipated, an enormous field of ore, under Conception Bay, multiplies many times the ore previously known.

There have been mined from about  $1\frac{1}{2}$  square miles upon the island about 7,000,000 tons, and there remains yet to be mined about 25,000,000 on this land area in the beds of both companies.

One of the beds has been followed without deterioration in size or quality for three-quarters of a mile, under the sea, into the areas of the Scotia Company. It is probable that the other beds extend there also.

The claims of this latter company cover an area of about 33 square miles, the greater part of which is probably underlaid by iron ore.

## Recent Progress in the Mineral Industry in the Thunder Bay and Rainy River Districts.

Before dealing with the progress made in the mineral industries in these two districts during the past year, it might prove of interest to readers of the Canadian Mining Journal to commence with a brief resume of the past history of the districts as regards mining. This synopsis must of necessity be exceedingly short, the purpose of this article not including anything in that direction of any great extent.

With what degree of justice the district of West Algoma can lay claim to having given the first impetus to the mineral industry of the entire province it is impossible for me to prove at the present moment, but this much may be positively asserted, that the mining history of this district dates farther back by many years than that of any of the mining camps of Ontario, either now being worked or which had been active in the past.

To quote a single example, the discovery of silver in the Thunder Bay District dates back to 1866-67, at which time the Shuniah and Thunder Bay mines were first opened up. In the following year the famous Silver Islet vein was added to the mineral discoveries of the district.

Two years later, in 1870, another of the precious metals, gold, was discovered in Moss Township, near the western boundary of Thunder Bay District, the first exploitation being at the Huronian Gold Mine, which attained some fame later on. This mine has the distinction of being the only mine in Ontario which has produced gold in the form of sylvanite, a telluride of gold, in any appreciable quantity. For the next few years after the discovery of this mine, our prospectors must have rested upon their laurels, for we hear of no new discovery of mineral being made until 1879-80, at which time, during the progress of the construction of the C. P. R., gold was found on Hay Island in the Lake of the Woods. Although this discovery should have given the frontiersmen of our province an incentive to prosecute further search for the same precious metal, we hear of no new discoveries being made until 1887, in which year the Gold Hill deposit was brought to notice.

In the meantime some further important finds of silver were made by Indians, and disclosed by them to the white men, as, for example, in 1882, the Rabbit Mountain, in 1883, the Palisades, a year later, the Silver Mountain, and 1885 the Beaver Mountain Mine. Although at this period the attention of prospectors

was generally devoted to gold and silver in preference to other metals, yet in the year 1887 another Indian added the so-called Atikokan iron range to the mineral discoveries, and about five years later the Matawin iron range was discovered, although the southeast margin of this range had already become known a few years previously, attracting, however, very little attention at the time.

After this a brief interval occurred during which the search for and discovery of minerals was at a standstill, until, in 1894-5, gold was found in the Rainy Lake, Sawbill Lake, and Island Falls region. This aroused considerable excitement, lasting for several years, and, had it not been for ignorance and stock-jobbing, the common but unwholesome concomitants of legitimate mining, we might to-day have the gold mining industry of this district in a flourishing condition. The little gold boom created by these finds found an echo in the Lake of the Woods and the Manitou districts, in the former of which activity lasted for some years, while in the latter the earlier activity was continued longer, owing principally to the discovery of the phenomenally rich vein at the Laurentian Mine.

Some three years ago the discovery of hematite in the Township of McTavish, in a locality now known as the Loon Lake District, caused considerable excitement for some time. As a matter of fact this was only a re-discovery of ore that had been first found in the earlier times when silver mining was at its height; at that date, however, it was regarded as being of little importance, silver being the only metal which was being searched for and desired.

In this connection it may be mentioned that the author, soon after his landing on the shores of Thunder Bay, about 20 years ago, recognized the identity of this rock-formation, here called the Animikie, with that in which the iron ore deposits of the Mesabi, Gogebic and others are located. He drew attention to this fact in a number of papers, notably in the one entitled "The genesis of the Animikie Iron Range." How slight, however, was the attention paid by the iron mining public to these publications may be gathered from the complete inactivity which to-day prevails in the direction of prospecting this formation for hematite deposits. The blame for this condition of affairs rests, however, not only upon the shoulders of the iron miners, but perhaps still more heavily upon those of our engineers and geo-



logists, who, either as the result of imperfect examination, or failure to recognize the character of these rocks, have completely ignored the fact of their identity with the rock formation of the American iron ranges. And for this reason the Animikie iron still awaits the work that shall awaken it from the slumber of ages.

I am compelled to register a somewhat similar complaint with regard to our Matawin range. Perhaps the largest low-grade iron range in existence on earth, which still lies idle as a silent witness to the lack of foresight on the part of our iron men. Not one of them has given a thought to the possibility of mechanically converting a large part of these deposits from a low-grade, non-bessemer ore into a very high-grade concentrate of the most desirable quality for steel pig. It reflects very little credit upon our Canadian iron men especially, that they have not made any effort to remedy the existing condition that, in our whole country, we do not possess one single good-sized body of ore, of which we confidently may assert that it is of bessemer grade.

In Sweden, Norway and Finland, where similar deposits exist, they are extensively worked and the ore is concentrated and converted into high-grade briquettes almost free from deleterious elements. Similar works exist even as far north as the Arctic Circle, where German capital, always on the alert to improve home industry by securing raw material in the cheapest possible market, has immense works under construction, of which one example is at Sydvaranger, where a plant is being built capable of converting 1,800,000 tons of 38 per cent. magnetite into 800,000 tons of ferric oxide briquettes. Why should not we in Canada follow this example and treat our Matawin iron ore as we see being done by those other nations, since it is to us of far greater importance, owing to the fact that we possess no high-grade ores and are in consequence compelled to go to the United States for raw material which we could provide ourselves in any quantity and for centuries to come?

But I fear that the editor of this journal will now be asking what recent progress I have to report in the mining and winning of the various kinds of ore? What must my reply be? The financial depression of last year has borne so heavily upon the mining industry of our two districts that I can say very little indeed about their progress in this regard; if, however, I am permitted to include the prospecting for and discovery of new ore deposits in this report, then I am able to announce some progress. Why, indeed, should not this be included and termed progress? Every little addition to our knowledge in this respect, and every stroke of hammer and pick means a step forward-towards the ultimate goal, the economical winning of these ores, and hence is to be regarded as progress in mineral industry.

#### Iron.

Since the Atikokan Iron Co. blew out their furnace at Port Arthur last year no iron ore was mined or shipped in either of our two western districts, but this inactivity in no way discouraged the work of the prospectors who were seeking for iron ore. These men were especially active along the line of the new Transcontinental Railway, where, first in the neighborhood of Buda, and later along a tract extending westward as far as Ignace, bog iron ore was discovered two years ago. Exploration was most successful at places where the ground was low and favorable for the formation of little ponds and lakes, into which the waters charged with iron, flowed and deposited their contents therein.

The latter settled among the peat-forming plants and these combined with the sand, which was similarly carried in, to form little beds of a brown, ochery, hydro-ferric oxide. Although, on account of the width of the area over which the deposits were found, a great number of claims have been taken up, nothing has yet been done to demonstrate the existence of this ore in larger beds, such as would be needed to make its operation a commercial success.

I learn that somewhat better results have been obtained farther north, along the line of the same railway, north of Sturgeon Lake. Here it is said that extensive beds of magnetite have been rediscovered. I use the word "re-discovered" because specimens of this ore have been repeatedly sent down from this region, many years ago, and reached my laboratory through the employees of the Hudson's Bay Co. or other fur traders, they having received them from trappers. In this region a very large number of claims were also taken up, from which, since they are situated only a very few miles from the line of the national transcontinental railway, the owners expect to ship ore down to the lake ports as soon as the road is completed.

Further prospecting for iron ores has been carried on along the southern extension of the Matawin range, where some American parties were using the government diamond drill to prosecute the work, but no results are at present available. At the western extension of the Atikokan Range some activity has been witnessed during the past year, the Oliver Iron Mining Co., of Duluth, having had three diamond drills at work in the search for magnetite, but as regards their success in their operations I have been unable to learn anything.

The same must be said regarding the results of some work which has been carried on by the government diamond drill a few miles farther west, near the outlet of Steep Rock Lake. This drill has been working upon an outcrop of ore which was considered to belong to the deposits of brown hematite of which a considerable number of floats were found scattered over that region some years ago. These floats were apparently an iron of great purity, containing hardly any phosphorus, sulphur or silica, but sometimes having an appreciable amount of manganese.

Some sporadic prospecting has been going on along the margin of the Animikie rocks, northeast of Port Arthur, in the hope of discovering red hematite, and the results here seem to have been identical with those reached in the vicinity of Loon Lake.

#### Silver.

The only signs of activity in mining for silver were those displayed in an attempt to open up the old Beaver Mine, and to build in connection with it a new stamp mill for treating the ore which the owners anticipate discovering in the mine and also in the old dump. The mine is now closed.

#### Gold.

In the numerous localities throughout our two districts, where gold occurs, the year 1908 has witnessed but little activity, with the exception of a considerable amount of prospecting work along the shores of Sturgeon Lake, where a large number of prospectors enlivened the stillness of these northern waters with drill, pick and hammer. If the numerous rich samples which came from that region are any criterion, the results must have been gratifying to the workers, a fact which is still further borne out by the large number of claims that have been taken up there during the past summer.



As yet another exception to the general inactivity, I might quote the Manitou country, where, in the early part of the year a considerable incentive was supplied to the large number of claim owners by the knowledge of the great richness of the Laurentian Mine. They were thus encouraged to prospect their possessions and, wherever veins of some promise were found, to commence development work. This work has to some extent been carried on, but I believe that lack of capital has been the only reason why more has not been heard of results in this direction, and better results been attained.

In the well-known gold-bearing area around Mine Centre, on Rainy Lake some good finds of rich ore are reported to have been made last summer, and I am hoping that these, together with the rich veins already known to exist, will shortly make Mine Centre once more the busy mining camp which it was several years ago.

In order to accomplish this, here and elsewhere, it is above all things necessary that the stock jobbing habit, of which I have so often complained, shall be completely done away, and that the monies realized from the sale of mining stock shall be put into the mine and not diverted into the pockets of speculators, promoters and others. Had this been done in years gone by, West Algonia would be able to show to-day a good many paying gold mines.

F. HILLE, M.E.

Port Arthur, Jan. 1, 1909.

### THE BRITISH MINT IN 1663.

The indefatigable Mr. Samuel Pepys, whose diary became an involuntary contribution to the history of his times, has left on record a surprisingly accurate account of routine and methods that obtained in the British Mint in the seventeenth century. The entry dated May 19, 1663, in Mr. Pepys' diary includes lengthy notes on the assaying, testing, and coining operations then in vogue.

On this May morning Pepys and his friend, Sir John Minnes, paid a visit to the Tower. Here they were shown the method of making the coin of the realm. So much was Pepys impressed with what he saw that he carefully noted every step and made transcriptions in his diary. Part of Pepys' entry must be quoted here: "After dinner went to the Assay Office and there saw the manner of assaying of gold and silver, and how silver melted down with gold do part, just being put into aqua-fortis, the silver turning into water, and the gold lying whole in the very form it was put in, mixed of gold and silver, which is a miracle; and to see no silver at all but turned into water, which they can bring again into itself out of the water. And here I was made thoroughly to understand the business of the fineness and coarseness of metals." With the remark that "the most observable in the making of money which I observed to-day is the steps of their doing it," Pepys proceeds to outline these steps. For the benefit of the reader, it has been thought best to paraphrase part of his description. This robs it of much of its flavour; but the immediate object of this short article is not literary, but technical.

1. Mr. Pepys explains the first steps with great minuteness. "Before they do anything they assay the bullion." To assay gold bullion, equal quantities [here Mr. Pepys is inaccurate] six and one-half ounces Troy of both gold and silver were wrapped up in lead foil.

If silver alone were to be assayed, a like quantity was taken. The assays were then placed in "little earthen cupps made of stuff like tobacco pipes, and put . . . into a burning hot furnace, where, after a while, the whole body is melted, and at last the lead in both is sunk into the body of the cupp, which [meaning the lead] carries away all the copper or dross with it, and left the pure gold and silver embodied together," or "the silver alone in these when it was put alone in the leaden case."

The process of "parting" was now in order. "To part the silver and the gold in the first experiment, they put the mixed body into a glass of aqua-fortis, which separates them by spitting out the silver into such small parts that you cannot tell what it becomes, but turns into the very water and leaves the gold at the bottom . . . with the silver wholly spit out, and yet the gold in the form that it was doubled together in when it was a mixed body of gold and silver, which is a great mystery; and after all this is done to get the silver together out of the water is as strange." Thus Mr. Samuel Pepys, in the year of our Lord, 1663, marvels at the mysteries of science. The solution of silver in nitric acid and the subsequent precipitation of that silver in the form of a chloride fill him with wonder. Also his curiosity is aroused. Accepting the disappearance and re-appearance of the silver as inexplicable, he determines to learn all that he can of the objects and logical relationship of succeeding operations.

Elucidating matters further, Mr. Pepys continues: "The piece of gold that goes into the furnace twelve ounces, if it comes out again eleven ounces, and the piece of silver which goes in twelve and comes out again eleven and two pennyweight, are just of the alloy of the standard of England. "If either the gold or the silver came out above these weights, "they are so much above the goodness of the standard, and so they know what proportion of worse gold and silver to put to such a quantity of the bullion to bring it to the exact standard." Conversely, if the assay proved the bullion to be beneath the standard, a suitable proportion of fine metal was added. Incidentally, the diarist alludes with pride to the fact that in the matter of standards that of Seville was the best, and that of Mexico worst, adding, "and I think they said none but Seville is better than ours."

Melting the standardized bullion into long plates was the next step. "If the mould do take ayre, then the plate is not of an equal heaviness in every part of it, as it often falls out."

Then, "to bring them to an even thickness all along and every plate of the same thickness," the plates were drawn between rollers. "It is very strange," observes Pepys, "how the drawing it twice easily between the rollers will make it as hot as fire."

In another pair of rollers the plates were drawn more exactly to a uniform thickness.

Then, fifthly, they were cut into round pieces, "which they do with the greatest ease, speed, and exactness in the world."

Next these pieces were weighed. Such as were overweight were filed down. Those that were underweight were set to one side, doubtless to be re-melted.

In passing the rollers the plates were bent and crumpled, and the round pieces often inherited these defects. "Therefore," writes Mr. Pepys, "they have a way of clapping 100 or 200 together into an engine,



which with a screw presses them so hard that they come out as flat as is possible."

The eighth step is brevity itself. "They blanch them."

Ninthly, "they mark the letters on the edges, which is kept as the great secret by Blondeau, who was not in the way, and so I did not speak with him to-day." It may be explained here that Peter Blondeau, a Frenchman, was the inventor, or the improver, of the method of coining by the screw-press. He was brought from France to London in 1649 expressly to improve the coinage. By the jealousy of the Company of Moneyers, his work was delayed for four years.

Lastly, the coins were milled. Mr. Pepys dwells upon this operation with such quaintness that he demands fuller quotation: "The mill is after this manner: one of the dyes [dies], which has one side of the piece cut, is fastened to a thing fixed below, and the other dye . . . to an engine above, which is moveable by a screw, which is pulled by men; and then a piece being clapped by one sitting below between the two dyes, when they meet the impression is set, and then the man with his finger strikes off the piece and claps another in, and then the other men pull again and that is marked, and then another and another with great speed. They say that this way is more charge to the King than the old way, but it is neater, freer from clipping or counterfeiting, the putting of words upon the edge being not to be done (though counterfeited) without an engine of the charge and noise that no counterfeit will be at or venture upon, and it employs as many men as the old and speedier. They now coin between £16,000 and £24,000 in a week."

The screw-press, fed by one man, a coin at a time, and actuated by three or four laborers; the crude assay equipment; the disproportionate weekly addition to the nation's wealth—all these things sound unreal when compared with the modern mint. Yet, in its day, the screw-press was considered a formidable affair, and the mint of 1663 no doubt aroused more genuine wonder than can be excited by any mint of to-day.

#### BULLETIN 359. UNITED STATES GEOLOGICAL SURVEY.

This bulletin deals with the magnetite deposits of the Cornwall type in Pennsylvania. These deposits occur near the edges of the belt of Mesozoic rocks which enters Pennsylvania along the Delaware River above Trenton, N.J., and extends across the State in a general southwesterly direction to the Maryland line.

Of the many formations which are comprised in the whole of the Pennsylvania Paleozoic section only the Cambrian quartzites, Cambro-Ordovician limestones, and the Ordovician shales occur in the region here under discussion. In the bulletin these are designated as sandstone, limestone, and shale, respectively. These formations extend over a belt of country from 10 to 20 miles wide, lying southeast of the Allegheny Front.

The Mesozoic strata, made up principally of coarse-grained red sandstone and red shale, are distributed in a belt from 8 to 12 miles wide, extending from the Delaware River southwesterly to the Schuylkill, thence westward to the Susquehanna, and again southwestward to the boundary between Pennsylvania and Maryland.

The zone comprising the various Mesozoic basins is

characterized by intrusions of diabase or surface flows of basalt, both of which are commonly called trap rock.

The ore deposits described in the following pages are intimately associated with the intrusive masses of diabase, and most of them are contained in calcareous strata either in Paleozoic limestone, outcropping near the edge of the Mesozoic belt, or in the beds of limestone conglomerate that locally mark the base of the Mesozoic section.

The ores are essentially magnetite, but they contain pyrite in amounts which make it necessary to roast them before they can be used in a blast furnace. Some specular hematite occurs in certain of the mines, but the amount of this mineral is relatively unimportant.

The ore occurs in large and small masses of varying form, either entirely enclosed by stratified sedimentary rocks or lying in such rocks where they come in contact with masses of intrusive diabase.

The iron content of these ores is extremely variable, but as the ore is mined probably averages not far from 45 per cent. Rather constant chemical characteristics are low phosphorus, high sulphur, silica, lime, and magnesia, and the presence of copper. Small amounts of cobalt have been found in some samples.

These deposits lie, in York County, in the Mesozoic strata, and in most of the other localities in limestones or limy shales of the Paleozoic age.

The geologic features of the various deposits which have been studied are thought to warrant the following general suggestions to those who in the future may make practical explorations for new ore bodies in this field:—

1. Ore bodies are to be sought only on or near the walls of masses of diabase.
2. Large masses of diabase are more favorable for ore deposits than smaller masses.
3. Cross-cutting intrusions and highly inclined sills are more favorable than sills of low inclination.
4. Limestones and limy shales are far more likely to be replaced by ore than clay shales or sandstones.
5. Particularly favorable locations for ore are found in masses of limestone that lie between bodies of diabase and beds that are in a marked degree less susceptible than limestone to the metamorphosing influence of igneous rocks.
6. The most promising situations will be found at places where the largest number of the above-stated favorable conditions occur in combination.

#### EXCHANGES.

**Industrial Progress, January, 1909, Vol. 1, No. 1.**—This new periodical, beautiful typographically and profusely illustrated, summarizes, by means of extracts from current magazines, progress made in power installation, mining machinery, pumping machinery, ventilating fans, etc., etc. The address of Industrial Progress is P.O. Box 1580, Milwaukee, Wisconsin.

The first article, "The Hydro-Electric Development of the Great Northern Power Co., Duluth, Minn." should be of particular interest to Canadian users of power.

**Mining and Scientific Press, January 23, 1909.**—A bill has been introduced into the California Assembly for the appointment of an inspector of mines. The Mining and Scientific Press, while it recognizes that the movement indicates growing interest in mining, alludes to the danger of premature action. The bill in



question endows the inspector with no positive authority. One section provides that the proposed official be liable for damage suit in case any person is "aggrieved, injured, or damaged by reason of the failure of said inspector to perform the duties herein required."

"The appointment," our contemporary remarks, "of a mine inspector without power would be to create a ridiculous supernumerary, to be fed at the public crib; to endow him with authority unrestrained by specific regulations enforceable under adequate penalty would be to let loose an autocrat who would inevitably discover a money-value for mildness in his edicts."

**The Engineering and Mining Journal, January 30, 1909.**—The Engineering and Mining Journal discusses the copper situation in this issue. Production of copper, it asseverates, is going on at a greater rate than ever before. Consumption is still below the normal. Yet there has been gross exaggeration of the stock of unsold copper. That stock is much smaller than has been supposed. "The world's stock of copper is not yet so big as to be a great drag on the market for a long time after consumption regains its normal rate. The question is simply how long we have got to wait for manufacturers to begin to buy."

**The Iron and Coal Trades Review, January 22, 1909.**—In summing up the situation of the American iron and steel industry, the Review asserts that the expectations and plans of American producers have been much modified by the past lean year. "It remains probable that a large part of the American productive capacity is likely to stay idle for a considerable period. Producers seem content with the condition . . . since there seems to be little desire to reduce prices in the hope of stimulating demand. A year's experience has shown that the policy of maintaining prices by a general understanding has a sounder basis than a mere verbal understanding through conference between the leaders. There is much more fear of unbridled competition than ever before."

### BOOK REVIEWS.

**Untechnical Addresses on Technical Subjects.** By James Douglas, LL.D. 12 mo. v+164 pages. Cloth, \$1.00. Second edition, with additional addresses. John Wiley & Sons, 43-45 East Nineteenth Street, New York.

The name of Dr. James Douglas is familiar to most of our readers. Several of his articles have appeared in the Canadian Mining Journal. For years he has contributed largely to the best technical literature of the day. As the administrator of large mining and metallurgical interests he has been phenomenally successful. One of the chief causes of his success has been the fact that he has always been keenly in sympathy with modern methods, and has constituted himself the apostle of the open door in the practical arts.

A long life of arduous professional and administrative work, profound reading, wide observation, cannot, alone, fit a man to write as Dr. Douglas writes. To these Dr. Douglas adds a rare qualification, a lofty conception of the duties and privileges of citizenship. This is the dominant note in the small volume under consideration. The author's own words express best his own ideals. Addressing the students of the Michi-

gan College School of Mines, in 1904, on the subject of wastes in mining and metallurgy, he concluded with these words: ". . . it will elevate your whole conception of the dignity of your profession and your work, if you regard yourselves, which indeed you should be, as the preservers of the gifts with which a beneficent Providence has stored our world; for next to being a creator, the highest function a man can attain to is being a saver—a saviour."

But Dr. Douglas is not merely an idealist. He writes of the broader national and international aspects of transportation, industries, and education. He correlates these activities. He traces the prodigious achievements of the nation down to the individual. He follows the efforts of the individual up to the total achievement of the nation. His essays are imbued with philosophical discernment and with practical sense.

Of "Untechnical Addresses" there are five, namely, "The Characteristics and Conditions of the Technical Progress of the Nineteenth Century," "The Development of American Mining and Metallurgy and the Equipments of a Training School," "Wastes in Mining and Metallurgy," "Some of the Relations of Transportation to Mining and Metallurgy," "Secrecy in the Arts."

All of these addresses are worth reading. To the student they will prove inspiring. To all classes of readers they will bring information set out in straightforward English and pleasantly seasoned with the ripe wisdom of a long and useful career.

### CORRESPONDENCE.

#### ON THE ORIGIN OF COBALT-SILVER DEPOSITS OF NORTHERN ONTARIO

Discussing, in a recent number of the Mining Journal, an article on the above subject, Mr. J. B. Tyrrell criticizes especially the description of some of the veins, the suggestion as to the origin of the silver, and the use of the term vein for certain fissure fillings.

Our descriptions do not agree because we were not describing the same type of vein. The difference of opinion concerning the origin seems to be one of terminology rather than of processes. I hope, therefore, to satisfy these criticisms by presenting more detailed description of the veins, and of the processes involved in their formation.

Since Mr. Tyrrell has suggested the use of the term "dyke" for some of the fissure fillings, and shows a preference for the term pegmatite, I add a few remarks in support of the term "aplitic vein."

#### Varieties of Argentiferous Veins in Diabase.

For purposes of discussion, it is of advantage to have in mind the chief types of argentiferous veins found in the diabase, and of these there are at least six fairly distinct ones.

Type 1. The fissure filling is chiefly cobalt and nickel arsenides with varying amounts of calcite. Silver occurs as a later crystallized constituent, disseminated through these minerals. These veins are but a few inches in width.

Type 2. The filling is chiefly silver or its compounds. These are generally very narrow and in some cases little more than films on the joint planes.

Type 3. The filling is chiefly coarsely crystalline calcite, with silver minerals in the cleavage cracks.

Type 4. The filling is fine grained aplitic material, chiefly feldspars with some quartz and calcite. The



silver is intimately associated with the calcite which is irregularly distributed.

Type 5. The filling changes more or less gradually from fine grained portions like type 4, to coarse grained portions, chiefly calcite.

Type 6. The filling is partly fine grained, like type 4, distinctly marked off from coarse grained calcite portions.

These are not the only types found in the diabase, but they indicate the chief varieties examined by the writer. In some cases the filling at different parts of the same fissure is not of the same type.

Type 4, 5 and 6 are especially prominent in the Elk Lake area. The aplitic veins of type 4 are of nearly the same grain from wall to wall, indicating that the fractured diabase was still quite hot when these fissures were filled. In some cases the walls are not distinct, indicating in these instances that the diabase mass had cooled but little, if any, below its melting point—these are typical “contemporaneous veins.” Type 5 indicates a gradual change in composition of the fluid filling on cooling, the feldspars being deposited, for the most part, before the calcite. Type 6 indicates a re-opening of the fissure after it had been sealed with aplitic material.

#### Differentiation in the Diabase Magma.

Mr. Tyrrell's statement that the idea of “concentration of the ores by magmatic differentiation” is “distinctly at variance” with my descriptions of order of formation of the vein minerals, implies a use of the term magmatic differentiation which I did not suggest.

The diabase has been fractured by stresses developed on cooling and the fissures filled with various minerals, some of which are of the types described above. Some clue to the origin of the solutions which intruded the fissures is afforded by an examination of the various rocks with which the ore deposits are associated.

In all parts of the district the silver veins are associated with diabase sills which are similar in composition and apparently of the same age. In the diabase there are small intrusive masses which are more highly feldspathic. These are apparently the result of contraction, fracturing, and resealing of fissures, due to cooling of an originally homogeneous magma, which had a chemical composition differing but little from that of the diabase.

There has been apparently no igneous activity since the complete solidification of the diabase magma. I have suggested, therefore, that the silver and cobalt were present in that hot solution, which was composed largely of the constituents of silicates, etc., with some water vapour and other gases. When, on cooling, the greater part of the magma had solidified the minor, still fluid portion contained a higher percentage of salic components (forming feldspar and quartz), water vapour, carbon dioxide, silver, etc. Such differentiated fluid materials were tapped by the opening of fissures in the cooling solid mass. According to local conditions of pressure and temperature, and the mobility of the materials, they escaped through or were deposited in those fissures. The feldspars were apparently deposited, for the most part, at high temperature in the diabase fissure. Other constituents in some cases escaped to the surrounding rocks. Some deposition was doubtless caused simply by loss of heat, some by mixing with the ground waters. According to the character of the rocks penetrated by the metalliferous solutions, and the nature of the fissures in them, the ores were there more or less concentrated.

The type of differentiation suggested as the cause of primary segregation of the silver is evidently not the same as that differentiation which is supposed to have been such an important factor in the formation of the Sudbury nickel deposits and some magnetite deposits. In the suggestion concerning the silver ores it is implied that the silver was in solution after most of the magma had solidified. In the primary concentration of the Sudbury ores there was apparently such fractional crystallization that ores separated in the solid form from a molten magma, and by gravitation and other forces were collected before crystallization of the other constituents took place.

#### Veins and Dykes.

I fail to see any advantage in using the term dyke in the sense suggested by Mr. Tyrrell. If the fissures were all of the composite nature described above as type 6, and if the metallic minerals were entirely confined to the coarse calcite portion it would be convenient to speak of the metalliferous and non-metalliferous portions by different names. But the veins are not all of this type, and some silver is found in the fine grained aplitic portions.

The use of the term “dyke” implies a mode of formation and a shape which are not well exemplified by these veins.

#### Aplitic and Pegmatite Veins.

There seems to be due an explanation for the double nomenclature applied to the highly feldspathic veins.

In masses of igneous rocks of various kinds there are frequently found veins which differ from the main mass in being lighter in color, and which are highly siliceous and aluminous in composition. Dark colored ferromagnesian minerals are present in small quantities or are entirely lacking. Many of these veins are apparently formed by intrusion of more acid products of differentiation in the magma.

The most common veins of this kind occur in granites, and they are known as aplites or pegmatites according to their texture.

The aplites are typically fine-grained and have quartz grains more or less round in outline.

The pegmatites are typically coarse to very coarse grained, and show peculiar regular intergrowths of quartz and feldspar known as graphic structure.

In the granites these veins consist almost entirely of alkali feldspars and quartz. In other rocks the composition varies according to and is determined by that of the parent mass.

Most of the feldspathic veins in the diabase examined by the writer are fine grained. Several specimens from James Township and Anima-Nipissing Lake, examined microscopically, show textures similar to that of aplites. The chief minerals present are feldspars, quartz, calcite and chlorite, plagioclase, feldspars predominating.

It would perhaps be useful to employ a more definite term in referring to these veins, which have not the same composition as the aplites occurring in granites. Similar veins in gabbro masses in the North Urals have been described by Duparc.\* He has named them plagiaplites, a term which might well be used by us.

While most of the feldspathic veins examined by the writer are aplitic, there are doubtless in the district

\*Arch. Sc. Phys. et nat. Geneve, 1902, 6 fevr.



veins of similar composition which have textures more like that of pegmatites.

R. E. HORE,  
School of Mining, Kingston, Ont.

Bridgewater, N.S., Jan. 6, 1909.

Editor, Canadian Mining Journal.  
Toronto, Ont.

Dear Sir,—I have read with much pleasure in your issue of Jan. 1 an article by Professor H. E. Haultain, entitled "The Mill Test for Gold versus the Assay; a Comparison in the Methods for Non-Technical Men."

The great advantage of having such papers before us is that it brings out the ideas of practical men and enables us to get at the best methods by comparing the results of our individual experience.

I do not know to what class of ore the writer refers, but, if he includes free-milling gold ores generally, I must strongly disagree with him as to the accuracy of his deductions. I refer particularly to the free-milling gold ores of Nova Scotia on which I have had continuous experience along these very lines for the past twelve years.

In the first place I do not think it fair to assume in comparing the relative merits of the two methods, that one is made carelessly and the other carefully, unless it is so stated at the beginning of the paper.

There is no reason why the mill test should not be in as competent hands as the assay.

Professor Haultain says, "The accuracy of the recovery of the gold from the plates depends on the skill and care of the man in charge." Does not the accuracy of the assay also depend on the skill and care of the man in charge?

He also says, "The very greatest care is needed before and after a test to clean out the box (mortar) and this cleaning out is a troublesome affair and even under the best conditions cannot be thoroughly done." I know that this can be thoroughly done, even as thoroughly as the mould can be emptied of its charge. Of course there is no question as to the loss in the tailings from the mill, but surely a careful mill test would hardly be complete without a careful sampling and assay of the tailings.

I fully endorse Prof. Haultain's statement regarding the importance of correct sampling. But sampling has its limitations. I do not agree with him that when you are dealing with free-milling gold ores a spoonful can always represent a car load, even with proper methods and proper care.

In comparing the accuracy of the mill test and the assay, why should the writer assume that the sample for the former is taken at random and for the latter carefully?

During the past three or four years I have been carefully following the work of one of our largest gold mines by assays of the ore as exposed in the working faces of the mine. It was found that although these samples were taken as carefully as possible, always taking large samples, usually in duplicate, the results did not accurately represent the value of the ore. They did, however, serve, in most cases, as an excellent guide. On the other hand a small 5-stamp mill installed about a year ago, particularly for this purpose, gave excellent results.

I wish it to be clearly understood that I do not underestimate the importance of careful sampling and assaying as a guide to future work; but where at all possible

this should be followed and the results checked by mill tests.

In conclusion I wish to refer to a paper by Professor H. Richards and E. E. Bugbee, of the Mass. Inst. of Technology, entitled "School Laboratory Work: A Free-milling Gold-Run." (Transactions A. G. M. E. 1904, pp. 478-486). The comparison of the assay versus mill-run as a basis of valuing a free-milling gold ore is very clearly shown in this case, where both are carried out with equal care and accuracy, as can always be done if it is insisted on.

Their results are exactly in line with my own experience on the same class of ore, except that in sampling the working faces of a mine the same degree of accuracy could not be obtained as in the case referred to. For the benefit of those who will not be able to refer to Prof. Richards' paper, I will quote a portion of his concluding remarks.

"As the value of the ore obtained by the mill run is much more accurate than that obtained by the assay \* \* \* In fact one of the objects of this work is to show the student *the impossibility of valuing a free-milling gold ore by sampling and assaying.*"

Very truly yours,

E. PERCY BROWN.

#### PERSONAL AND GENERAL.

Mr. J. B. Tyrrell and Mr. J. C. Murray, of Toronto, left on a week's trip to Gowganda on Feb. 2nd.

It is reported that Neil J. Gillis, M.L.A., will be appointed Deputy Inspector of Mines of Nova Scotia.

Mr. Frank Shepherd, of Nanaimo, has been appointed inspector of coal and metalliferous mines for British Columbia.

Mr. Frank C. Loring has been appointed to the position of consulting mining engineer to the Wetlauffer Lorraine Silver Mines, Limited.

Mr. Geo. Gray, of Stellarton, assistant general manager of the Acadia Coal Company, was nominated by the Liberals of Pictou as the candidates for the provincial election to be held February 16th, but owing to business reasons was unable to accept.

Mr. Thos. Reid, identified as sales manager of the John Bertram & Sons Co., Limited, for many years past has moved his headquarters to Montreal where he will be associated with the Canadian Fairbanks Co., Limited, the general sales agents of the Bertram Co. On account of the importance of the Montreal machine tool market this move is evidently an advantageous one to both the Bertram Co. and the Canadian Fairbanks Co.

#### INDUSTRIAL NOTES.

J. M. Pipe and Boiler Insulation Catalogue, No. 100.  
H. W. Johns-Manville Co., 100 William St., New York.

This well-illustrated catalogue shows the many uses of asbestos and magnesia products. The firm of H. W. Johns-Manville Company has had fifty years of experience in the manufacture of asbestos and magnesia products. Pipes, boilers, and furnaces absolutely require coverings in order to avoid the loss of radiation and condensation, and thereby reduce the cost of fuel, which is a very large item in modern manufacturing.



This catalogue deals with coverings for high and medium pressure pipes, cold water pipes, hot air furnace pipes, with some special coverings for pipes used for brine and ammonia. It is just as important that boilers, domes, and cylinders should be covered as that pipes should be protected in order to prolong the life of the metal. For such use sheets and blocks of various thicknesses according to the pressure, etc., are recommended. The sheets and blocks are finished with half-inch coat of asbestos or magnesia cement filling. There is included in the catalogue a price list for the coverings, blocks, cements, etc.

After exhaustive trials with five different types of rescue apparatus—British and foreign—at the Howe Bridge Rescue Station, near Atherton—the largest yet erected in the United Kingdom—the Lancashire and Cheshire Coal Owners' Association have adopted the improved Fleuss-Siebe-Gorman, and Messrs. Siebe, Gorman & Co., Ltd., of "Neptune" Works, London, are now engaged in manufacturing the necessary equipment for this station and surrounding collieries.

The Wood Drill Works, of Paterson, N.J., has issued a twelve page booklet entitled "Wood" Rock Drills, giving some valuable information and full description of the machines, showing their adaptability to tunnel driving, drilling in concrete, and open cut work; with detailed costs in driving the Tieton tunnel of the U. S. Reclamation Service at North Yakima, Wash., also on other engineering works, with a number of fine testimonials. The booklet is printed in three colors, and can be obtained from the A. R. Williams Machinery Co., Toronto.

Through the Allis-Chalmers-Bullock, Limited, Montreal, we have received Bulletin No. 1063, issued by the Allis-Chalmers Company. Gas engines and generators are the topics touched upon. After tracing briefly the advantages of the producer and gas engine, the distinctive features of Allis-Chalmers gas engines are outlined. The valve gear, ignition system, air starting device, and lubrication, are described. Engines from 300 to 5,000 h.p. are manufactured by the Allis-Chalmers people.

## SPECIAL CORRESPONDENCE

### NOVA SCOTIA.

The output of the Dominion Coal Company's collieries for January was about 200,000 tons, compared with 314,000 in January of last year. The output for February is expected to be about the same as that for January. The mines are now working about two-thirds time.

The Mabou Colliery, which for some time has been in the hands of the Government, pending an adjustment of the finances of the company, has been allowed to fill with water. A feeder has been coming in, presumably from the sea, and it has been found cheaper to allow the mine to fill than to attempt to keep it pumped out. Whenever conditions will permit of the operation of the mine there will be no difficulty in unwatering the workings and coping with the feeder.

#### Naked Lights vs. Safety Lamps.

We are glad to see that the Maritime Coal & Railway Company have put in safety lamps in their Chignecto Mines, since the burning accident previously referred to in these columns. We also understand the Inverness Coal & Railway Company are abandoning the use of naked lights. This is as it should be, and it may confidently be expected that before very long no naked lights of any description will be used in Nova Scotian coal mines.

In the United States the year 1908 achieved the ghastly record of the highest death rate in coal mines the world has ever seen. The present year bids fair to equal its predecessor. Hardly a day passes but the newspapers record a coal mine disaster. It may be that the disaster involves a mere half dozen men, or the death roll may extend to hundreds. The thing has become so common that one hardly notices the figure. We read it and think no more about it, and oftentimes it is difficult to know whether the account one is reading is that of a new explosion or the one that happened yesterday.

We read after these explosions that the mine was "reported safe," whatever that may mean; or vague hints are given of the possible connection between a seismic disturbance in Calabria, with an explosion in a naked light colliery in, say, Virginia, U.S.A. Is it not time to cease such cant and quasi-scientific blatherumskitel and put the blame for mine explosions where, in nine cases out of ten, it properly belongs, namely, to the account of naked lights and careless shot-firing.

We have in mind a case that came under our personal observation. A rent appeared in the pavement of a coal seam. The opening extended for a distance of forty feet, and emitted gas in such quantities that the intake air was fouled up to the fan-drift against an incoming air pressure of 200,000 cubic feet of air per minute. Safety lamps were used in this mine, and although some of the gauzes became red-hot and the men had to flee for their lives without their clothes, so rapidly did the gas come upon them, no explosion occurred, and nothing was injured. But what would have been the tale had naked lights been in use, or had one naked light been present? No one would have lived to tell it. Another case occurred in a seam that for years had been worked with naked lights. One day two men were working an electric coal-cutter alongside a fault. A pocket of gas must have been present in the vicinity of the fault, which the sparking of the motor ignited, and both men were killed. A gentleman recently giving evidence before the Royal Commission on Safety in England explained his antipathy to naked lights by relating that for 25 years his father had worked in a mine where naked lights were in use, but one day the mine exploded, and every person below, the witness's father included, lost his life.

In the "Colliery Guardian" for the 15th January this year is the account of an explosion that killed three men at Blaenavon, Wales. For four years the Inspector of Mines, Mr. Martin, had urged upon the management of this colliery the risk they were running in using naked lights. Even after this accident the manager said he was prepared to take the responsibility of working the mine with naked lights.

If an Inspector of Mines is to be of any benefit at all we think it should be in his discretion to prohibit the use of naked lights on his own judgment, without the necessity of resorting to the intervention of a Commission or of arbitration. Events are tending this way in England, and it may be fairly anticipated that one of the recommendations of the present Commission will be to give the Inspector power to enforce the introduction of safety lamps. We are a little ahead of England in this respect in Nova Scotia.

The figures collected by a previous English Commission proved that 80 per cent. of the explosions in mines were directly due to naked lights. Is it too much to say that if safety lamps had been made compulsory in all coal mines that the



enormous death roll attending these explosions would have been prevented, in part if not wholly?

### BRITISH COLUMBIA.

#### Rossland, B.C.

Mining throughout this whole district has received a setback from the extremely cold weather that prevailed in January; that has affected the ore shipments of the district to a very considerable extent for the first month of 1909. Owing to the slush and ice in the Kootenay River the West Kootenay Power & Light Co. was forced to stop its water wheels, with the result that the mines and smelters of Rossland and the Boundary were without the heavy voltage electric power that they depend upon the Bonnington Falls power plant to furnish for the lighting of the mines and to turn many of the wheels about the works. At the Trail smelter it was found necessary to draw the matte from the furnaces when the power was shut off, and one pot of matte exploded, setting fire to the building, which has caused a week or ten days further delay at that plant. At the works of the British Columbia Copper Co. having been forced to close down, the company took advantage of the moment to make some needed repairs, with the result that the amount of work lost at that mine has been much more than the few days of the shut-down of the power plant amounted to. The same condition, to some extent, prevailed all through the mining district for two or three weeks. There is always a lot of work that cannot be done without a shut-down, and the mine managers avoid shutting down unnecessarily, hence, when nature takes a hand and compels the mines to close many repairs are undertaken and a lot of clearing up work done that has been accumulating for some time. A coal shortage last week was the cause of about 80 men being laid off at the Le Roi mine. Many of these will be taken back as the coal supply gets better, and, it is hoped, that before very long the full force will be at work again.

The report of the Le Roi Mining Co. for the 15 months ending September 30th, 1908, is not exactly suited to bringing joy to the heart of a shareholder, although there are some redeeming features to it. The financial statement shows a debit to loss and gain account of £24,895 for the period. This figure is arrived at after writing off £27,108 2s. 4d. for exploration and development; £9,701 0s. 3d. on account of depreciation, and £3,994 17s. 5d. for sundry items, making a total deduction of £40,804 0s. 5d. The liabilities of the company are shown on the financial statement as £65,326 10s. 8d., while the assets appear as £95,792 6s. 6d., showing a surplus of £30,465 15s. 9d. This figure is very much lower than the surplus appeared for the year 1907, when it was £74,259 19s. 4d. The company, it appears, mined 100,444 "dry" tons of ore for the 15 months which it is said carried an average of .363 oz. gold, .55 oz. silver and 1.22 per cent. copper, from which it realized about \$11.11 per ton. The cost of mining and treating this product of the mine was \$11.71 per ton, which figure, when compared with the other, speaks for itself. This cost in 1907 was \$10.02, and in 1906 \$10.50; there were heavy fixed charges spread over the smaller tonnage shipped in 1908 than during the two previous years, however, and there is no way that these charges can be reduced to any extent under the present system. To the lay observer, who may not be acquainted with important facts bearing on the case, it looks as though the company ought to make a better showing; that is, it seems to one that the Le Roi mine produced enough good ore during the period named to have paid a good profit, and aside from the fact that they paid off a part of the bank overdraft, there is a showing on the wrong side of the book. If the Northport smelter, with its heavy fixed charges, is responsible for this loss, is there not some way that this asset (?) could be done away with and the concern placed on a paying basis? If this was done and a little more economy exercised in connection with the London office, then the Le Roi

mine ought to pay profits as easily as the other large producers on Red Mountain are doing. Might as well have a reconciliation now as any later date and make a new start, if such a course is necessary.

The operators of the I. X. L. shipped a 6 ton lot of ore to the smelter last week. The last lot of ore that the lessees of this mine shipped returned them over \$100 per ton, and it is expected that this 6 tons will average fully as much.

**Phoenix.**—The output of the Boundary mines has been somewhat curtailed during the past few weeks. During the week ending January 30, the Snowshoe and Oro Denoro again appeared on the shipping list, the total output of the district for that week being 32,301 tons, which is getting up near the standard output once more.

There are nearly 240 men employed in the Mother Lode mine at present. It takes a much larger force to get out the required amount of ore for the big smelters here during the winter months than in summer, when glory hole operations can be advantageously carried on. The reason is obvious; but the ore shipped from the underground workings is of a much higher grade than the product of the glory hole; for one reason there is a better chance to select ore for stoping, and ore sorting can be carried out on a better scale.

The mines of the Dominion Copper Co. are free from water, and everything is being kept in condition for a resumption of work when the order comes along, which manager P. F. Roosa says will very likely be some time during the coming six weeks. The machinery at the smelter is being fixed up so that there will be no delay at that end when shipments are begun.

The Granby Company is making an average of close to 2,000,000 lbs. copper per month, from which they should realize a net profit of \$65,000 to \$75,000, as it is understood they are making copper for a little over 10c per lb., when working at the normal capacity of the smelter.

Development on the Johannesburg claim, Greenwood, is giving most satisfactory results. It is anticipated that this big, low-grade deposit will contribute a considerable tonnage to the output of this district some day in the future.

The work of installing the new tram on the Golden Eagle mine has begun, and it is expected that the work will be finished and ore travelling over the tram in a couple of months.

For some weeks it has been rumored that Frank A. Ross has resigned from the Daly Reduction Company, Hedley, and that M. K. Rodgers, who formerly had charge, would again become associated with the Nickel Plate Mine. Mr. Ross now denies this, and states that the mine will be started up again as soon as water is available for the mill, and that the same management will be in charge of the work, as was the case last year.

The 450 ft. tunnel on the Woodburn has been completed, but it will be necessary to make another contract and drive this adit a still farther distance before the ore body will be encountered. The present showing in the face of the tunnel is satisfactory to a degree, the rock being well mineralized.

There is no doubt but the time is coming when dredging will be carried out on a goodly scale in the Similkameen. There is a large area of promising ground in the districts where placer mining was carried on in the early days, and where a dredging enterprise would pay handsome profits at the present time. Hydraulic mining has been tried along some of the streams in this section of the country, but various unfavorable conditions were against the profitable working of the ground gone over. A large force of Orientals still find it profitable to work much of this ground. The conditions in many places are suitable for dredging, as the gravel would not average over 30 ft. deep and the bedrock is not too hard, so that a good clean-up can be made. This Similkameen gravel will carry from 25c to 30c per yard on an average, and occasional rich pockets will be encountered. As is fairly well known, the dredging companies of other



districts are working gravel that only carries 15c per yard, it costing them in the vicinity of 8c per yard to do the work. As coal and other necessary supplies can be obtained at a reasonable price in the Similkameen, it will be seen that a good margin of profit should be realized on dredging in this locality.

The Greenwood prospecting tunnel scheme crops up from time to time, and it is now stated that a German syndicate has raised sufficient funds to begin work, and that operations will be started during the next few months.

**Nelson.**—The unwatering of the Silver King Mine is being rapidly carried on. A bailer is being used at present, but an electric pump will be placed at work in the mine to keep the water from accumulating when once it is all out. The force will be materially increased as soon as this is accomplished.

The bond on the Queen Victoria, the big low grade copper deposit, has been thrown up by F. A. Erlund and associates. A payment of \$15,000 became due a few days ago, and the syndicate gave up the bond rather than pay this amount, even though they had already expended nearly \$60,000 on the property. The claim has accordingly reverted to J. P. Swedberg, the original owner.

The Nugget Mine, Sheep Creek, has turned out four good bricks to date. The one shipped last week weighed 305 oz., and was worth \$5,000. The present production of the 4 stamp mill has been brought up to \$5,000 from \$1,500 by Manager J. L. Warner, since November last. It is the intention to increase the capacity of the mill to ten stamps.

On the Independence claim, of the Mother Lode group, they have cut the vein 133 ft. in from the portal; this at a depth of 86 ft. from the upper workings and 126 ft. from the surface outcropping. The ore at this point is similar to that found in the upper workings, which has returned the operators an average of \$2,450 per car of 30 tons.

The True Blue group of claims on True Blue Mountain have been bonded, and work is to commence. It is said that True Blue Mountain is a huge mass of low grade ore, and that the day is not far away when a heavy tonnage will be shipped from this locality.

At the Eleventh Annual Convention of the Associated Boards of Trade of Eastern British Columbia, held at Trail, B.C.,

Jan. 27-28, '09, the following resolutions affecting the mining industry were adopted:—

“Resolved, That the time of expiration of leases on mineral claims ceases at noon, instead of at midnight.”

“Gold and silver to be purchased in Canada for coinage purposes at the Canadian Mint.”

“In contemplation of the production of spelter in quantity by the zinc smelter now working at Nelson, that we represent to the Dominion Minister of Finance the necessity of a rearrangement of the duty upon zinc products coming into Canada, and to the Minister of Trade and Commerce the necessity of seeking, through the medium of Canadian trade channels, for possible markets abroad.”

**Vancouver.**—There is a movement afoot here to have a smelter built along the lines of the Nelson electrical zinc smelter, which could treat the zinc ores of the northern country, but more particularly of the district in the vicinity of South-eastern Alaska.

W. E. Young, of New York, has renewed options on a number of Kamloops mining properties. It is said that Mr. Young has the Newhouse and Guggenheim interests back of him, and that the plan they will try to put through is to acquire a large number of claims and then their holdings would warrant the building of a smelter at or near Kamloops. A reduction plant close at hand will be a necessity for the future success of Kamloops as a mining centre.

A lively interest is being taken in the smaller copper mines on the Coast, and several new ones have begun shipments to the Tyee smelter. The gradual rise in the price of copper seems to be the principal cause of this movement.

The output of the Cornell Mine, Texada Island, is to be shipped to the Tyee smelter. A test shipment recently sent to this plant returned the operators over \$20 per ton after paying all charges.

The company operating the Early Bird Mine, Moresby Island, recently sent 500 sacks of rich ore to the Tacoma smelter, from which they received over \$60 per ton. This old mine was worked by the Hudson's Bay Company in the early days, that company taking nearly \$80,000 worth of gold out of the workings, but owing to trouble they had with the hostile Indians of the locality, the mine had to be abandoned.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Sydney.**—The Scotia Fire Brick Co., Ltd., has been formed to manufacture fire brick and fire-resisting goods from the deposits at Coxheath.

**Glace Bay.**—It is reported that the coal industry of Pictou County is in a very satisfactory condition, all the collieries of the Acadia Coal Co. are working full time. The Drummond Colliery at Westville is also working quite steadily.

There is a probability of work being resumed at the Broughton coal areas of the C. B. Coal, Iron & Railway Co. The areas will be worked either by the company that now owns them, which will be refinanced for the purpose, or they will be bought and worked by the C. P. R., which holds an option on the properties.

The sea entered the Mabou coal mines last week, completely flooding the mines. It is believed the sea broke in at a depth of 1,400 feet in a level unused for some considerable time. The property worked steadily till last October, since which time, on account of trouble with the syndicate, the Provincial Government has been in charge with about forty men at work,

under a Government inspector. It is thought that the mine can be pumped out.

### ONTARIO.

**Cobalt.**—An important strike has been made at the La Rose at the 200 ft. level. When starting a winze to raise up to the 110 ft. level, the main La Rose vein was encountered, showing eleven inches wide, and running over 4,000 ounces of silver to the ton. Up to this time no ore bodies had been thoroughly tested and blocked out below the 110 ft. level. This new strike proves values down 90 feet farther.

The Cobalt Central concentrator is now handling 100 tons per day. New machinery has recently been installed, and the plant now contains twelve tables, three jigs, two crushers and a conical pebble mill, besides smaller machinery. One hundred and twenty men are now employed on the property.

A vein two inches wide and carrying very rich ore has been discovered on the Townsite mine at the 90 ft. level.

The Silver Belt Telephone Company will have wires in operation from Smyth to Gowganda early in February. A modern



wire will be installed from Smyth to the main line of the T. & N. O. to make long-distance connection with Toronto.

The Temiskaming have their new twenty-drill compressor installed and ready to run. At the 200 and 250 ft. levels the ore bodies run from ten to forty-three inches in width, and they give an assay of five thousand ounces. Last year the Temiskaming produced over one million five hundred thousand ounces of silver at a total cost of six and a half cents per ounce. During the last three months of the past year over half a million ounces were mined and shipped at a cost of five and a half cents per ounce. This was done with a small plant working at the 250 ft. level.

The Coniagas Company has been successful in its action before the Chancellor against the town of Cobalt and one Jacobson. The defendants are owners of lots and streets, but the Coniagas Company hold the patent for mining rights there.

The Kerr Lake Majestic is being put in shape for active development, and a 12-drill compressor plant with engines, hoists, and other machinery is being installed. It is expected to be in full swing early in March.

The Beaver Mining Company have been fined \$200 and costs in the Cobalt Police Court for not having their shaft properly protected. The charge was laid by Mr. T. E. Corkill, Inspector of Mines, after the recent fatality at the mine.

The Hargrave Company have made an offer to the Kerr Lake Company to pay the latter a tonnage royalty on Hargrave ore mined and taken out through Kerr Lake workings. The Hargrave Company want to carry the Kerr Lake sixth level across the Hargrave line to break into Hargrave ore.

Negotiations of a similar nature are on between the Cobalt Lake and Cobalt Station Companies.

La Rose No. 3 vein (where the surface exposure of native silver was for a long time the show vein of the camp) is now being worked at the 120 ft. level. The vein in both drifts shows three inches wide, and carries 5,000 ounces of silver to the ton. The south cross-cut from the main shaft is in nearly 600 feet. When in 225 feet a native silver vein was cut and drifted on for 60 ft., showing a rich, narrow vein of native silver and argentite. The veins located last summer on the surface south of the office and carrying 2,000 ounces of silver to the ton will be reached any day now in this cross-cut and values demonstrated at depth.

One hundred and eight veins have been found on Nipissing. Three hundred and ten men are employed, and there are 20,000 ft. of underground development work.

**Gowganda.**—One thousand acres at north end of Gowganda Lake has been selected as a townsite by the Government. Surveying will start as soon as weather permits. The lots are to be sold by auction.

The plant has been purchased for a newspaper to be devoted to the interests of Gowganda.

**Fort William.**—The Northern Pyrites Company has sent out a trial shipment of six cars. Four cars have been sent to the Austin Mfg. Co., Harvey, Ill., and two cars to the Detroit Chemical Works, Detroit, Mich.

#### ALBERTA.

**Medicine Hat.**—The new natural gas well in the Medicine Hat field has now developed a flow of five million cubic feet per 24 hours. This is the greatest gusher in Canada.

**Lethbridge.**—The Canada West Coal Company, at Taber, has partially suspended operations. About 150 men have been laid off. The reason assigned for this action is shortage of orders for coal.

#### BRITISH COLUMBIA.

Greenwood, Jan. 25th.

The fourth general meeting of the Western Branch of the Canadian Mining Institute was held at Greenwood, January 25th and 26th. In the unavoidable absence of A. B. W. Hodges, chairman of the branch, the meeting was presided over by S. S. Fowler, Riondel.

Resolutions were passed, first, congratulating R. W. Brock on his appointment as director of the Geological Survey; second, endorsing the proposal to apply to the Dominion Government for monetary aid to the Nelson zinc smelter; third, expressing appreciation of the action of the Provincial Government in having assisted the same industry.

A suggestion was made that the Provincial Government be requested to subsidize the Branch, as it already does farmers' institutes.

Several interesting papers were read and discussed at the meeting. Afterwards the visitors were taken through the British Columbia Copper Company's smelter and the Mother Lode mine.

**Cranbrook.**—A company has been incorporated in Washington to work coal lands at McGillivray Creek. Arrangements are under way for the installation of the plant.

**Ymir.**—It is reported that the Canadian Girl and American Girl mines near here have been sold to a New York syndicate.

**Phoenix.**—The B. C. Copper Company took advantage of the forced shutdown recently, through lack of power, to make some necessary repairs to the smelter plant, thus obviating a shutdown later on.

Development work at the B. C. Copper Company's Lone Star mine has been suspended until spring.

The first carload of ore under the new management of the Republic mine has reached the Granby Smelter.

**Ingenika.**—The Ingenika-Findlay River Development Company have, according to the Vancouver World, between fifty and sixty claims on the Ingenika River and McConnell Creek. The company has an outfit, including boiler, sinking pump and geeral plant, now going in over the snow by dog teams.

**Vancouver.**—The discovery is reported of lode veins of platinum ore and gold-bearing fissure veins of quartz rock thirty miles south of Hope.

**Whitewater.**—The contract for driving 1,500 ft. of cross-cut for the Whitewater Deep Mine has been awarded to Frank Wilson and the Lade Bros. of Rossland.

**Vancouver.**—As the first step towards securing the largest fleet of gold dredges in operation in the North, a big dredge, costing \$70,000, was purchased in Vancouver for the Yukon Basin Gold Dredging Company. This company now controls 20,000 acres of rich dredging ground on the Stewart River.

**Victoria.**—The Pacific Tin Mining and Smelting Company, incorporated last month, intend erecting a smelter here to treat tin ores from Seward Peninsula, Alaska.

The new company has a working agreement with the owners of the Goodwin tin group, in the Seward Peninsula, Alaska, to take the whole of the output of the mine, which is proven to be one of the richest in Alaska. The Goodwin tin group is situated on Tin Mountain. This mountain contains almost the only workable tin in place so far discovered.

**Yukon.**—The first concentrator erected in the Yukon is at Conrad, Windy Arm. It is owned and operated by the Yukon District Gold Mining Co., Ltd., a Canadian corporation, with head offices at Toronto. It has been in operation since November 1st, 1908, has a capacity of 100 tons per day, and is supplied with ore from the Venus mine.



# MINING NEWS OF THE WORLD.

## GREAT BRITAIN.

An official table issued by the Home Office gives the number of fatal accidents in and about coal mines during 1908 as 1,136, as compared with 1,162 in the preceding year. The total number of deaths resulting was 1,306, as compared with 1,245 in 1907. The total number of deaths caused by accident in metalliferous mines was 37, an increase of 3, and fatalities in quarries numbered 92, as against 89 in 1907.

The wages of Northumberland coal miners have been reduced 3¼ per cent.

Owing to the scarcity of radium, a syndicate has been formed in London for working the pitch blende deposits in the Trenwith copper mine, Cornwall, with the hope of producing radium in commercial quantities. Previous to the discovery of radium the pitch blende was thrown away after the copper and uranium had been extracted.

## RUSSIA.

An extensive export trade in steel rails is being developed. The Societe Dnieproviennne Metallurgique du Midi de la Russie alone shipped 37,866 tons during the eight months ending with October last. Of these 14,016 tons were exported to Italy and 6,285 tons to Japan.

An Anglo-Japanese syndicate has been formed for the purpose of exploiting on a large scale the gold, silver and copper deposits of Manchuria on the right bank of the Yalu.

Rich silver-lead ores have been discovered in Murman in the far north of Russia near the Norwegian frontier. It is intended to develop the deposits, using electricity generated from water power for smelting the metals.

## GERMANY.

A new battery of 60 coke ovens is about to be established at the works of the Deutscher Kaiser Gewerkschaft at Ham-born.

## SWEDEN.

The total production of iron ore in Sweden in 1907 was 4,478,917 tons from 294 mines, a decrease of 23,000 tons as compared with 1906. The output of pig iron was 615,778 tons, an increase of 10,989 tons. The number of workmen employed at the iron mines and smelting plants was 9,970, a decrease of 525 as compared with 1906.

## AUSTRALASIA.

Tests of the Dawson coal of Queensland have proved very satisfactory, showing that it can be economically used in place of coke as fuel in suitable suction producer gas plants.

Upwards of 15,000 acres in the northern territory of Australia have been secured by different companies and syndicates for gold dredging. A dredging plant is to be sent to the territory in March and is to be operated on Sandy Creek. A lucrative alluvial gold industry was formerly carried on in some of these fields.

The labor dispute at Broken Hill, N.S.W., involving several thousand miners has been characterized by rioting and conflicts with the police. A number of unionists were arrested. The water main leading from the concentrating plant to the mill at one of the mines has been blown up.

Australian mining companies are contracting with the Cape Explosives Co. of South Africa, an offshoot of the De Beers Mining Company, for a supply of explosives by Australian manufacturers.

## SOUTH AFRICA.

Extensive floods which prevailed in January throughout the Transvaal and Northern Natal, caused considerable loss of life in the mining districts. The flooding of the Witwatersrand gold mine owing to the bursting of a dam resulted in the drowning of 160 mine employees, ten of whom were white men and the others natives.

Experienced prospectors who have returned from the new diamond diggings at Rietfontein in the Vryburg district report that the fields are not payable owing to the shallowness of the diamondiferous soil.

The attempt made by a Durban syndicate to work the deposits of molybdenum in the mountainous districts of Natal has been abandoned.

## INDIA.

It is announced that the Tata Iron & Steel Co., Bombay, will in the spring proceed with the erection of a new plant at a cost of £1,500,000, including blast furnaces, open hearth steel furnaces and rolling mills.

## CHINA.

The deposits of gold near the city of Laichowfu have been opened under the direction of the Chinese Government, and the enterprise has turned out successful though only antiquated methods of mining are employed.

Deposits of coal have been located by an American engineer in Shensi Province, and a Chinese-American syndicate has applied for a concession.

## UNITED STATES.

The suit brought by the farmers of Deer Lodge County, Montana, against the Anaconda Copper Mining & Smelting Co. to recover \$2,000,000 damages and secure an injunction to prevent the operation of the smelter on the ground that the fumes were injurious to vegetation, has been dismissed by the court. The hearing of the case lasted for one year and two months, and the judge took nearly two years to deliberate before giving his decision.

The convention of the United Mine Workers of America held at Indianapolis adjourned on February 6th after a three weeks' session. They demanded an 8-hour day for the miners in the Pennsylvania anthracite districts, increased pay, and full recognition of the union.

Seventeen miners were killed by an explosion in the No. 2 Short Creek mines of the Birmingham Coal & Iron Co., of Alabama, on February 2nd.

The Frick Coke Company has abandoned work on 1,700 additional coke ovens at Uniontown, Pa., and will substitute for them an enormous by-product coke plant at Gary, Ind.

Congress has been asked for an appropriation of \$2,500,000 for a fireproof building for the Geological Survey and other bureaus of the Department of the Interior.

## MEXICO.

Prospecting is being conducted with good results west of Laguna, a station on the Mexican Central Railway, in the northern part of Chihuahua. The ores are mainly gold and silver-bearing copper and lead sulphides.

A party of engineers under the direction of Pearson's Oil Field Department have left San Cristobal, Vera Cruz, on an expedition through the States of Chiapas and Tabasco for the purpose of making a geological and geographical survey of a region very little known.

The third furnace of the American Smelting & Refining Co. at Chihuahua has been blown in. The smelter is now treating 400 tons daily.

The Cananea district is resuming its former activity. Four of the Green-Cananea Copper Company's furnaces are in operation, and the other four will shortly be started.

## COMPANY NOTES.

### WATTS MINING CO.

The annual statement of the Watts Mining Company shows that mining expenses for the year were \$70,466.62, and general expenses \$18,497.14. Against this there were credited sales of ore amounting to \$131,582.62, from which had to be deducted for smelting and other charges \$14,204.98. The income account therefore shows that this mine only made \$18,244.40 for the year.

Another feature in the statement is that the Watts Mining Company at the end of the year, November 30, owed the King Edward Mining Company \$98,803.05, and other creditors \$11,107.76, a total of nearly \$110,000.

### NIPISSING EARNINGS.

President Earle says that during October, November and December, Nipissing earned a little over \$100,000 net each month. The indications are that January returns will be fully as good. This means at the rate of \$1,200,000 a year, which is equal to 20 per cent. on the \$6,000,000 stock.

The superintendent in charge of operations reports that a strike has been made on the Fourth of July shaft at a depth of 138 ft. There a vein running from one to two inches in width was found, the ore assaying as high as 2,000 ounces of silver to the ton.

A cheque for \$49,518.29 was received by the Provincial Treasurer on February 3rd from the O'Brien Mine, being the 29 per cent. royalty for the last three months of 1908.

The net profits for La Rose for seven months amounts to nearly \$650,000. This ore has come out of pure development work. Much of this work is in new territory and on new veins.

### LE ROI MINING CO.

On Friday, the 8th of January, the ninth ordinary meeting of the Le Roi Mining Co., Limited, was held in London, at which the reports of the directors; of W. A. Carlyle, M.E., consulting engineer; of A. J. McMillan, managing director, and of A. J. Larson, superintendent, were read and adopted.

The directors' report is for the 15 months ending September 30, 1908. The accounts show a balance to the debit of profit and loss £24,895 on the operations of the company for the period under review. The result is arrived at after writing off the sum of £40,804 0s. 5d, made up as follows: Exploration and development, £27,108 2s. 4d; depreciation of machinery and plant, surface improvements, etc., at the mine and smelter, £9,701 0s. 3d.; other items of expenditure, £3,994 17s. 10d. This makes a total of £40,804 0s. 5d. The liabilities of the company on September 30, 1908, amounted to £65,326 10s. 9d., and the liquid assets amounted to £95,792 6s. 6d., showing a surplus of liquid assets over liabilities of £30,465 15s. 9d.

The mineral property owned by the company forms a block of 142 acres in the centre of the Rossland mining belt, the larger part of which is virgin ground.

The report of W. A. Carlyle, M.E., consulting engineer, deals with the work done and the different veins and ledges. A definite plan for future development and prospecting of the mine was drawn up by Mr. Larson, superintendent, and himself. Mr. Carlyle praises Mr. T. Kiddie's work at the smelter, but says his costs would be materially reduced if a larger tonnage of ore was available for treatment.

A. J. McMillan, managing director, in his report stated that the severe decline in the market values of copper and silver had affected the mine greatly. Copper dropped from 22½¢ per lb. to 13¼¢ during the year, and silver from 68¢ per ounce to 51¼¢ per ounce.

The cost of mining, smelting and realization per ton in 1906, when 110,042 tons were mined, was \$10.50; in 1907, when 131,696 tons were mined, was \$10.02, and in 1907-8 (15 months), when 100,444 tons were mined, was \$11.71. During the year the ore values have increased \$1.40 per ton. The ore contained nearly 5 pounds more copper to the ton than in 1907, but owing to the fall in the price of that metal, the realization was less than during the previous year.

The ore smelted at Northport during the period ending September 30th, 1908, amounted to 124,263 dry tons. The matte shipped was 2,780 tons, valued at \$1,164,912.63, equal to \$418.97 per ton.

The report of A. G. Larson, superintendent, is substantially as follows:—

The tonnage extracted was made up as follows:—

|                                    |             |
|------------------------------------|-------------|
| Main vein .....                    | 30,093 tons |
| North vein .....                   | 4,498 "     |
| South and Intermediate veins ..... | 43,364 "    |
| Black Bear claim .....             | 22,489 "    |

Total . . . . . 100,444 tons

Main Vein.—The ore from this vein was of good shipping grade, and came chiefly from the 100, 350, 500, 700 and 800 ft. levels. Quite an important tonnage was found in parts practically abandoned some years ago. Development work is now under way on the 1,200 ft. level with a view to proving the downward continuation of this ore body.

North Vein.—The tonnage extracted from this vein is not as large as last year. The ore, though small in quantity, is of a good shipping grade.

South and Intermediate Veins.—The development work carried on resulted in opening up an immense amount of ore, a great deal of which was, however, too low grade to ship. At the present time development work is being done on what has every indication of being a large chute of ore, considerably above the average grade of the mine.

Black Bear Claim.—Payable ore bodies have not been found yet at a greater depth than 1,125 ft. Considerable work was done on the 1,200 ft. level, but the ore was scattered and too low grade to have commercial value.

Ore Production.—The ore mined and shipped during the year amounted to 100,444 tons, its metal values averaging: Gold, .363 oz.; silver, .55 oz.; and copper, 1.22 per cent. per ton, equal to an average value of \$11.11 per ton.

Development.—The details of development work during the year are as follows:—

|                                       | Footage. | Total cost   | Aver. cost Per ft. |
|---------------------------------------|----------|--------------|--------------------|
| Raising and winzing .....             | 485      | \$17,417.74  | \$35.91            |
| Cross-cutting and drifting ....       | 5,921.5  | 91,303.02    | 15.42              |
| Station and pocket cutting, etc. .... |          | 747.56       | .....              |
|                                       | 6,406.5  | \$109,468.32 |                    |
| Diamond drilling .....                | 5,224    | 14,305.17    | \$2.74             |
|                                       |          | \$123,773.49 |                    |



**NO CROW'S NEST DIVIDEND.**

Secretary Young of the Crow's Nest Coal Company has announced that no dividend will be paid to shareholders of the last half of 1908, in view of the heavy losses of the company in the Fernie fire, as well as the general depression.

**LE ROI NO. 2 COMPANY.**

The December report of Paul S. Counlley, mine manager, is as follows: Ore shipped, 2,410 tons. The smelter receipts were \$24,759, being payment for 1,995 tons shipped, and \$744 being payment for 73 tons concentrates shipped; in all, \$25,503.

## STATISTICS AND RETURNS.

**SMALL OUTPUT OF COAL.**

The output of the Dominion Coal collieries in January was 195,971 tons, for the same month last year it was 314,000 tons, illustrating the slackness of the present season. Last month was the smallest January output in several years, two years ago having been 45,000 tons more.

**SCOTIA STEEL OUTPUT.**

The Nova Scotia Steel and Coal Company's January output was 57,530 tons of coal, 5,730 tons pig iron, all steel products 6,498 tons.

**DOMINION STEEL.**

Dominion Steel's output for January was 21,100 tons pig iron and 22,073 tons of steel. The total shipments were 20,037 tons.

The rail mill, which has been idle for some time, will probably resume operations shortly.

**COBALT ORE SHIPMENTS.**

Following are the weekly shipments from Cobalt camp and those from Jan. 1, 1909, to date:—

|                               | Week ending<br>Jan. 23.<br>Ore in lbs. | Since<br>Jan. 1.<br>Ore in lbs. |
|-------------------------------|----------------------------------------|---------------------------------|
| Chambers-Ferland .....        | 62,000                                 | 142,000                         |
| Kerr Lake .....               | 62,460                                 | 123,460                         |
| King Edward .....             | 53,920                                 | 53,920                          |
| La Rose .....                 | 393,650                                | 924,100                         |
| Nova Scotia .....             | 41,390                                 | 401,390                         |
| Nipissing .....               | 186,033                                | 398,795                         |
| Peterson Lake .....           | 81,560                                 | 81,560                          |
| Right of Way .....            | 244,715                                | 244,715                         |
| Temiskaming .....             | 60,000                                 | 60,000                          |
| Temiskaming & Hudson Bay .... | 184,060                                | 264,060                         |

Ore shipments to date for 1909 are 3,124,745 lbs., or 1,562 tons.

The total shipments for week ending January 23 were 1,369,788 lbs., or 684 tons.

|                               | Week ending<br>Jan. 29<br>Ore in lbs. | Since<br>Jan. 1.<br>Ore in lbs. |
|-------------------------------|---------------------------------------|---------------------------------|
| Crown Reserve .....           | 160,700                               | 280,700                         |
| Cobalt Central .....          | 41,238                                | 81,238                          |
| City of Cobalt .....          | 155,840                               | 218,930                         |
| La Rose .....                 | 320,700                               | 1,244,800                       |
| McKinley-Darragh .....        | 121,500                               | 227,080                         |
| Nipissing .....               | 525,000                               | 923,855                         |
| Temiskaming. . . . .          | 130,000                               | 190,000                         |
| Temiskaming & Hudson Bay .... | 60,000                                | 324,060                         |

Ore shipments to January 29 for 1909 are 4,639,813 lbs., or 2,319 tons.

The total shipments for week ending January 29 were 1,515,068 lbs., or 757 tons.

|                               | Week ending<br>Feb. 6.<br>Ore in lbs. | Since<br>Jan. 1.<br>Ore in lbs. |
|-------------------------------|---------------------------------------|---------------------------------|
| Buffalo .....                 | 44,260                                | 88,280                          |
| Coniagas .....                | 126,590                               | 271,905                         |
| Crown Reserve .....           | 272,540                               | 553,240                         |
| Cobalt Central .....          | .....                                 | 81,238                          |
| Chambers-Ferland .....        | .....                                 | 142,000                         |
| City of Cobalt .....          | .....                                 | 218,930                         |
| Kerr Lake .....               | 81,637                                | 205,097                         |
| King Edward .....             | .....                                 | 53,920                          |
| La Rose .....                 | 310,620                               | 1,555,420                       |
| McKinley-Darragh .....        | 41,000                                | 268,080                         |
| Nipissing .....               | 255,310                               | 1,179,165                       |
| Nova Scotia .....             | .....                                 | 401,390                         |
| Nancy Helen .....             | .....                                 | 40,000                          |
| Peterson Lake .....           | .....                                 | 81,560                          |
| O'Brien. . . . .              | 64,040                                | 127,880                         |
| Right of Way .....            | .....                                 | 244,715                         |
| Temiskaming .....             | 120,000                               | 310,000                         |
| Trethewey .....               | 125,400                               | 185,400                         |
| Temiskaming & Hudson Bay .... | .....                                 | 324,060                         |
| Muggleby Con. ....            | .....                                 | 72,900                          |

Ore shipments to February 6, 1909 are 6,081,210 lbs., or 3,040 tons.

The total shipments for week ending February 6 were 1,441,397 lbs., or 720 tons.

**CROW'S NEST PASS COAL CO.**

The output of the Crow's Nest Pass collieries for the week ending January 22 was 15,033 tons, being a daily average of 2,505 tons.

For the week ending January 29th totalled 18,348 tons; daily average, 3,058 tons.

The output for the week ending February 5th was 16,979 tons, a daily average of 2,830 tons.

**B. C. ORE SHIPMENTS.**

The following are the ore shipments for the week ending Jan. 23rd and year to date in tons:

**Boundary Shipments.**

|                   |        |        |
|-------------------|--------|--------|
| Granby .....      | 14,421 | 45,074 |
| Mother Lode ..... | 9,744  | 22,134 |
| Snowshoe .....    | 820    | 6,336  |
| Other Mines ..... | .....  | 651    |
| Total .....       | 24,985 | 74,105 |

## Rossland Shipments.

|                            |       |       |
|----------------------------|-------|-------|
| Le Roi .....               | 634   | 2,216 |
| Le Roi No. 2 .....         | 810   | 1,392 |
| Le Roi No. 2, milled ..... | 206   | 620   |
| L. X. L. ....              | 8     | 8     |
| Other Mines .....          |       | 3,656 |
| Total .....                | 1,712 | 7,892 |

The total shipments for the past week were 30,242 tons and for the past year to date 91,039 tons.

## Granby Smelter Receipts.

## Grand Forks, B.C.

|              |        |        |
|--------------|--------|--------|
| Granby ..... | 14,421 | 45,074 |
|--------------|--------|--------|

## B. C. Copper Co.'s Receipts.

## Greenwood, B.C.

|                   |       |        |
|-------------------|-------|--------|
| Mother Lode ..... | 9,744 | 22,134 |
| Other Mines ..... |       | 1,850  |
| Total .....       | 9,744 | 23,984 |

## Le Roi Smelter Receipts.

## Northport, Wash.

|                   |     |       |
|-------------------|-----|-------|
| Le Roi .....      | 634 | 2,216 |
| Other Mines ..... | 292 | 788   |
| Total .....       | 926 | 3,004 |

The total smelter receipts of the various smelters for the past week were 27,679 tons and for the year to date 84,477 tons.

The following are the shipments for the week ending Jan. 30th and year to date in tons:

## Boundary Shipments.

|                   |        |         |
|-------------------|--------|---------|
| Granby .....      | 22,100 | 67,174  |
| Mother Lode ..... | 7,686  | 29,820  |
| Oro Denoro .....  | 420    | 1,050   |
| Snowshoe .....    | 2,090  | 8,426   |
| Other Mines ..... |        | 21      |
| Total .....       | 34,239 | 108,434 |

## Rossland Shipments.

|                            |       |        |
|----------------------------|-------|--------|
| Le Roi .....               | 746   | 2,962  |
| Le Roi No. 2, milled ..... | 200   | 880    |
| Centre Star .....          | 1,979 | 5,551  |
| Other Mines .....          |       | 1,484  |
| Total .....                | 2,985 | 10,877 |

The total shipments for the past week were 40,976 tons and for the year to date 271,297 tons.

## Granby Smelter Receipts.

## Grand Forks, B.C.

|              |        |        |
|--------------|--------|--------|
| Granby ..... | 22,100 | 67,174 |
|--------------|--------|--------|

## B. C. Copper Co.'s Receipts.

## Greenwood, B.C.

|                   |       |        |
|-------------------|-------|--------|
| Mother Lode ..... | 7,686 | 29,820 |
| Oro Denoro .....  | 420   | 1,050  |
| Other Mines ..... |       | 1,220  |
| Total .....       | 8,106 | 32,090 |

## Le Roi Smelter Receipts.

## Northport, Wash.

|                   |       |       |
|-------------------|-------|-------|
| Le Roi .....      | 746   | 2,962 |
| Other Mines ..... | 296   | 1,084 |
| Total .....       | 1,042 | 4,046 |

The total smelter receipts of the various mines for the past week were 36,064 tons and for the year to date 120,374 tons.

## SILVER PRICES.

|               | New York. | London.  |
|---------------|-----------|----------|
|               | Cents.    | Pence.   |
| Jan. 23 ..... | 51 1-2    | 23 3-4   |
| Jan. 25 ..... | 52        | 23 15-16 |
| Jan. 26 ..... | 52 3-8    | 24 1-8   |
| Jan. 27 ..... | 51 3-4    | 23 13-16 |
| Jan. 28 ..... | 51 3-4    | 23 13-16 |
| Jan. 29 ..... | 51 1-2    | 23 3-4   |
| Jan. 30 ..... | 52 1-8    | 24       |
| Feb. 1 .....  | 52 1-8    | 24       |
| Feb. 2 .....  | 51 7-8    | 23 7-8   |
| Feb. 3 .....  | 52 1-8    | 24       |
| Feb. 4 .....  | 52        | 24       |
| Feb. 5 .....  | 52        | 24       |

## MARKET REPORTS.

February 5—

Connellsville coke, f.o.b., ovens:—

Furnace coke, prompt, \$1.65 to \$1.75.

Foundry coke, prompt, \$1.85 to \$2.00.

## Metals.

February 5th—

Tin, Straits, 27.55 cents.

Copper, prime Lake, 13.75 to 14 cents.

Lake, arsenical brands, 13.50 to 14 cents.

Electrolytic copper, 13.50 cents.

Copper wire, 15.25 cents.

Lead, 4.10 cents.

Spelter, 5.07½ cents.

Sheet zinc, 7.50 cents.

Antimony, Cookson's, 8.05 cents.

Aluminium, 24 cents.

Nickel, 40 to 47 cents.

Platinum, \$22.50 to \$23.50 per ounce.

Bismuth, \$1.75 per pound.

Quicksilver, \$44.50 per 75-lb. flask.

The Robb Engineering Company, Limited, of Amherst, N.S., have recently received the following orders from Cobalt, Ont.: For the Crown Reserve Mining Co., one 30 h.p. Robb-Armstrong vertical engine; for the Colonial Mining Co., one 75 h.p. Robb-Armstrong vertical engine; for the Temiskaming Mining Co., two 100 h.p. Robb-Mumford water tube boilers.



# JUDICIAL SALE

## OF THE MINING PROPERTIES OF THE LARDER LAKE PROPRIETARY GOLD FIELDS, LIMITED.

Pursuant to the Winding Up Order made by the High Court of Justice in the matter of the Larder Lake Proprietary Gold Fields, Limited, and in the matter of the Winding Up Act, being Chapter 144 of the Revised Statutes of Canada, 1906, and Amending Acts, and dated the 23rd day of October, 1908, and with the approbation of George Kappel, Esquire, K.C., Official Referee, sealed tenders marked "TENDER FOR LARDER LAKE PROPERTY" will be received, addressed to "OSLER WADE, 64 WELLINGTON STREET WEST, TORONTO," Liquidator of the above named Company, up to four o'clock in the afternoon of Monday, the 8th day of March, 1909, for the purchase of the following assets of the said Company, consisting of thirty-seven mining claims, situated in the Townships of Gauthier, McVittie, and McGarry, in the Larder Lake Mining Division, District of Nipissing and Province of Ontario, and certain miner's supplies and other effects, all of which are set forth and described in the parcels hereinafter mentioned:—

### PARCEL 1.

Group of four claims around Bear Creek, in the Township of McGarry. The survey numbers and recorded numbers of the said claims are respectively as follows:—

| Survey Number. | Recorded Number. | Survey Number. | Recorded Number. |
|----------------|------------------|----------------|------------------|
| L. M. 79       | 1937             | L. M. 80       | 1936             |
| L. M. 81       | 1943             | L. M. 82       | 1945             |

There is a camp on L. M. 79, comprising: A bunk house, 18x20 ft.; cook house, 18x20 ft.; blacksmith shop, 12x14 ft., and a clearing of several acres. Bear Creek runs through L. M. 79, and according to a survey and an engineer's report, the creek can be utilized on L. M. 79 to develop power. Complete plans and profile of the survey and the engineer's report have been filed with the Department of Mines.

### PARCEL 2.

Group of fourteen claims near Larder Lake, in Township of McGarry. The survey numbers and recorded numbers of the said claims are respectively as follows:—

| Survey Number. | Recorded Number. | Survey Number. | Recorded Number. |
|----------------|------------------|----------------|------------------|
| L. M. 83       | 1965             | L. M. 84       | 1960             |
| C. E. 31       | 2132             | C. E. 34       | 1889             |
| C. E. 33       | 1883             | C. E. 36       | 1885             |
| C. E. 37       | 1887             | H. F. 35       | 2201             |
| H. F. 37       | 2018             | H. F. 38       | 1949             |
| H. F. 39       | 1961             | H. F. 195      | 1888             |
| H. F. 196      | 1884             | H. F. 197      | 1886             |

Claims L. M. 84 and H. F. 35 are subject to claim C. E. 62 so far as it overlaps. There is a well-equipped camp on said claims which consists of: One frame mill, 40x49 ft., with 18 ft. walls, and a battery of five stamps; engine house, frame, 20x30, equipped with 25 hp. engine and 35 hp. boiler, and an eject forcing pump, three-inch discharge, fully connected; storehouse, 14x20; cook house, 20x30; office, 20x30; bunk house, 1½ storeys high 20x28; stable, 15x22; blacksmith shop, equipped, 13x15; powder house, 12x18; a wharf, 16x35, and the goods and chattels of the Company, which consist of dynamite, tools, and other

**TITLE**—The claims contained in said parcels have a total acreage of approximately 1,300 acres, and have all been duly and properly recorded and surveyed and survey plans with field notes attached, filed with the Department of Mines. At least ninety days' assessment work has been performed upon each of the said claims. The remaining assessment work to be performed upon each of the said claims may be completed before August 1st, 1909.

An inventory of the goods and chattels of the Company and plans and photographs of the property may be seen on application to the undersigned.

**TERMS OF SALE**—Tenders are invited for the purchase of the five parcels "en bloc." Tenders may also be made for the parcels separately, and in case the whole property can be sold more satisfactorily in parcels, such tenders may be accepted. A marked cheque for ten per cent. of the tender, payable to the order of the Liquidator, Osler Wade, must accompany, as a deposit, the tender or tenders from each person. If a tender is accepted, twenty-five per cent. thereof must be paid within two weeks and the balance within three months from time of acceptance. The highest or any tender not necessarily accepted. The assessment work not performed to be completed by the purchaser, and the purchaser to take such title as the Company now has. The other terms and conditions of sale may be seen on application to the undersigned, and each tender shall be subject to those terms and conditions. The tenders will be opened by the Official Referee, George Kappel, Esquire, K.C., at his offices, Home Life Building, Toronto, on Tuesday, the 9th day of March, at 4 p.m.

For further information apply to the undersigned.

Dated this 26th day of January, 1909.

When answering Advertisements please mention THE CANADIAN MINING JOURNAL.

miners' supplies, all of which will be sold with the said claims. In the erection of the above-mentioned buildings the purchase of the machinery and plant and installation of same, and the purchase of said goods and chattels, there has been expended upon the said claims a large sum of money.

### PARCEL 3.

Group of nine claims, situated around Tournene and Bear Lakes, and close to Larder Lake. The survey numbers and recorded numbers are respectively as follows:—

| Survey Number. | Recorded Number. | Survey Number. | Recorded Number. |
|----------------|------------------|----------------|------------------|
| H. S. 101      | 2035             | H. S. 126      | 2028             |
| H. S. 102      | 2034             | H. S. 191      | 2031             |
| H. S. 104      | 2137             | L. M. 85       | 2217             |
| H. S. 123      | 2029             | L. M. 86       | 2218             |
| H. S. 124      | 2030             |                |                  |

### PARCEL 4.

Group of six claims, in the vicinity of Pancake Creek, close to Larder Lake, Township of McVittie. The survey numbers and recorded numbers of said claims are respectively as follows:—

| Survey Number. | Recorded Number. | Survey Number. | Recorded Number. |
|----------------|------------------|----------------|------------------|
| L. M. 50       | 2071             | L. M. 53       | 2486             |
| L. M. 51       | 2202             | L. M. 54       | 2072             |
| L. M. 52       | 2453             | L. M. 55       | 2203             |

### PARCEL 5.

Group of four claims, near Fork Lake, Township of Gauthier. The survey numbers and recorded numbers of said claims are respectively as follows:—

| Survey Number. | Recorded Number. | Survey Number. | Recorded Number. |
|----------------|------------------|----------------|------------------|
| L. M. 45       | 2378             | L. M. 47       | 2377             |
| L. M. 46       | 2389             | L. M. 48       | 2391             |

W. M. DOUGLAS,  
Solicitor for Liquidator,  
70 Home Life Building, Toronto.

# A Handy Reference List

We urge you to examine the books listed below with great care. Some are brand new—all are standard. We can supply any technical book in print

## Copper

### Principles of Copper Smelting

BY EDWARD D. PETERS.

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**MINING LICENSES**, giving the right to work the mine and dispose of its products, are granted on payment of a fee of \$10.00 and a rent of \$1.00 per acre per annum. Such licenses are valid for one year and are renewable on payment of the fee and of the same rent. They may cover from 1 to 200 acres or one and the same person, and must be marked out on the ground by posts.

The description or designation must, however, be made to the satisfaction of the Minister.

Persons working mines must send in yearly reports of their operations to the Government.

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The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year, or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey made, and upon complying with other requirements, purchase the land at \$1 per acre.

The patent provides for the payment of a royalty of 2½ per cent. on the sales.

Placer mining claims generally are 100 feet square; entry fee \$5, renewable yearly.

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- Stamp Mills—**  
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*We make a specialty of*

### Manganese Steel Castings

*for Mining purposes.*

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Strength up to standard specifications, and permanent.

Used by the leading Mining Companies of the Maritime Provinces.

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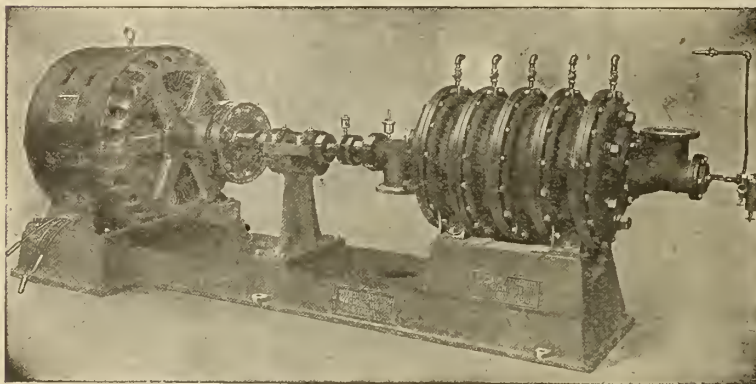
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## The operation of pumps with Westinghouse Motors

will in almost all cases, excepting in very large water works, show a far greater economy than with steam-driven units. The power delivered at the pump shaft by a Westinghouse motor is at the same economical rate as that of the highly efficient engines in the power house, less the small electrical losses

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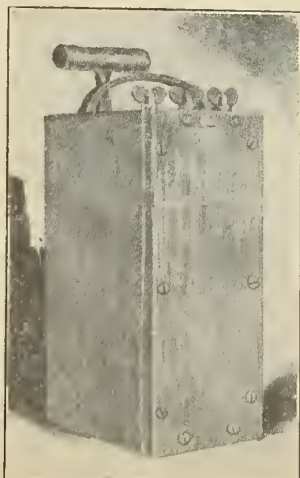
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High Explosives, Stumping Powder, Blasting and  
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Safety Fuse, Electrical Fuses, Batteries, and other  
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## NOBEL GELIGNITE A New High Explosive

It always breaks cleanly to the bottom of the drill holes.  
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INTERCHANGEABLE

**"Universal" Picks**

They cut more Coal in less Time than any others  
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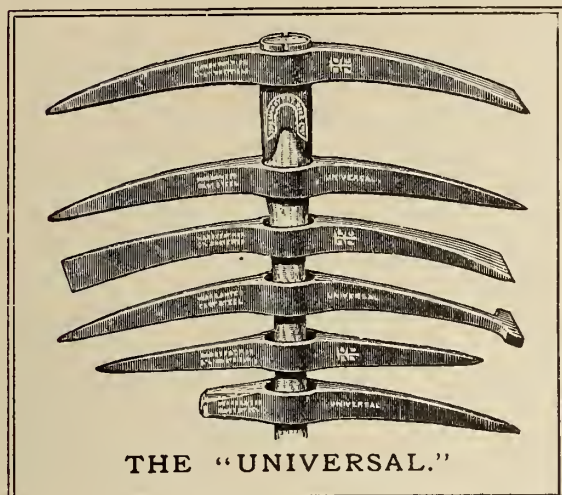
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For HAND POWER, for ROCK and COAL  
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A One-Man Stope Drill

If you are doing any stoping or up-raising it will pay you to use a "Cleveland." To prove this we will ship you an equipment complete so that you can prove to your own satisfaction that it

**SAVES TIME, LABOR,  
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We offer you a simple, durable, "fool-proof" machine which we will guarantee will do more work than any similar machine on the market at less cost for maintenance.

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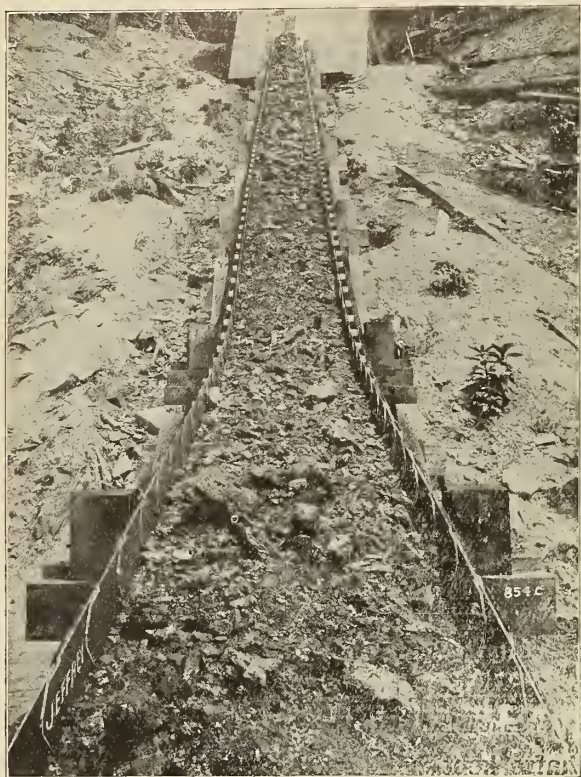
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Cobalt, Ontario.

ROCK DRILLS, PNEUMATIC TOOLS, HOSE, DRILL STEEL, ETC.







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are the best made for delivering coal from upper to lower tippie without breakage. We have Conveyers of this type in operation handling from 50 to 500 tons, distances as great as 1150 ft.

Descriptive Catalog X67

WE BUILD

**Complete Coal Mine and Tippie Equipments**

including

Electric Locomotives, Coal Cutters, Drills, Car Hauls, Coal Washeries, Screens, Crushers, Fans, Cages, Pumps, Hoists, Elevators, etc.

General Catalog X80

**THE JEFFREY MFG. COMPANY**  
COLUMBUS, OHIO, U.S.A.

Canadian Offices and Works: **MONTREAL**

## SULLIVAN AIR COMPRESSORS

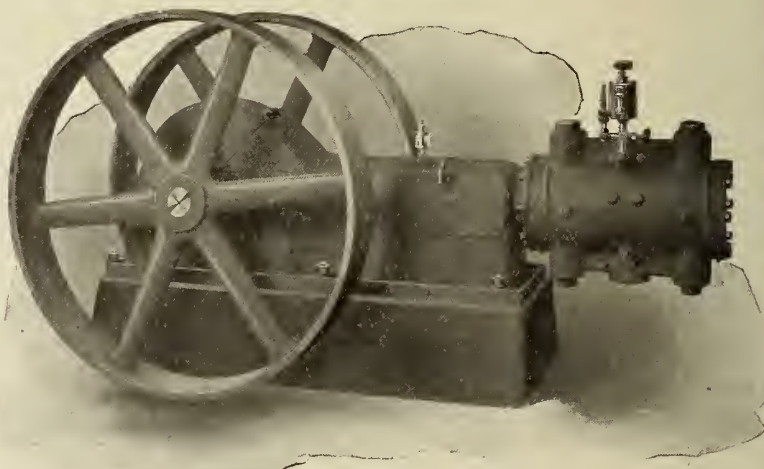
**Sullivan** small Air Compressors, of the straight line pattern, are built in capacities from 90 to 175 cubic feet of free air per minute, steam or belt driven.

They are carefully designed to secure compactness, light weight, without weakness and durability of the working parts.

These machines are particularly suitable for small or temporary plants. Their low weight makes transportation an easy matter.

Send for Catalog No. 658.

**Rock Drills   Coal Cutters   Diamond Drills**



Sullivan Class "WG3" Air Compressor

Straight-line, single-stage air, belt driven; all working parts are enclosed by a housing and run in oil.

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# Mining Machinery

## ROCK DRILLS

$2\frac{3}{4}$  in. x  $6\frac{1}{4}$  in., 3 in. x 6 in.,  $3\frac{1}{8}$  in. x 6 in.,  $3\frac{1}{4}$  in. x  $7\frac{1}{4}$  in., slightly used.

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5 in x 7 in.,  $6\frac{1}{2}$  in. x 8 in., 7 in. x 10 in., 8 in. x 12 in. Double cylinder, single drum.

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6 in. x 6 in. and 12 in. x 12 in. Steam actuated.

## LOCOMOTIVE BOILERS

28, 35, 40 and 50 h.p.

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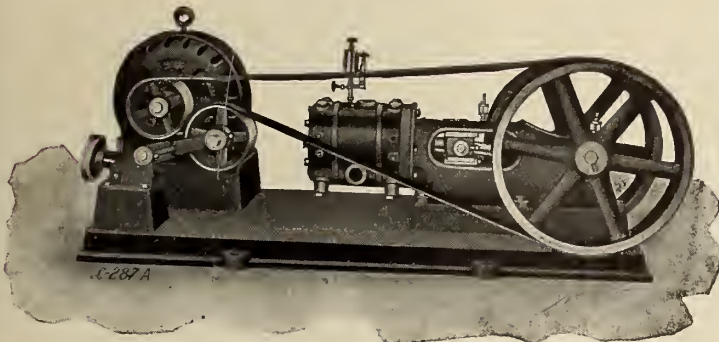
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# Straight-Line Power Driven Air Compressors



Centre-Crank Type, Mounted on Cast-Iron Base.

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These machines are built for vacuum pumps, for vacuum cleaning systems and other purposes, and for all pressures from one to one hundred pounds per square inch.

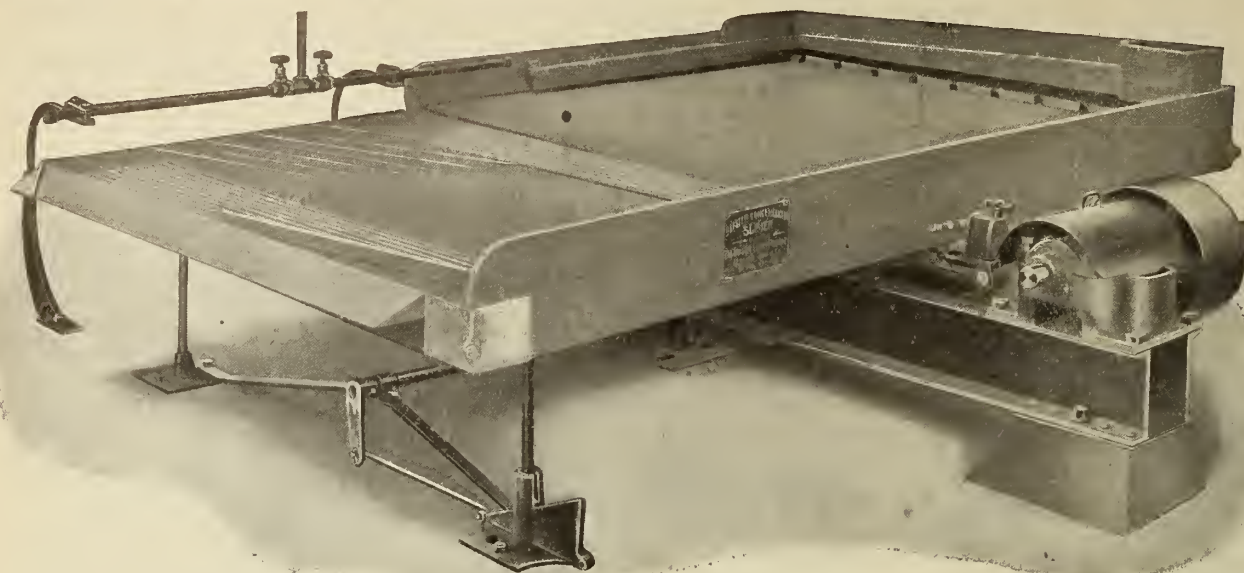
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The greatest advance in slime concentration attained in recent years has been accomplished by this table. Its success is emphasized by the fact that as the result of an elaborate competitive test with vanners of various makes **70 of these Tables are now in operation in the new mill of the Goldfield Consolidated Mines Co., Goldfield, Nevada**

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Branches at Cobalt, Elk Lake, Gowganda and Latchford in the silver mining camp of New Ontario and throughout Canada; also in the United States and England.

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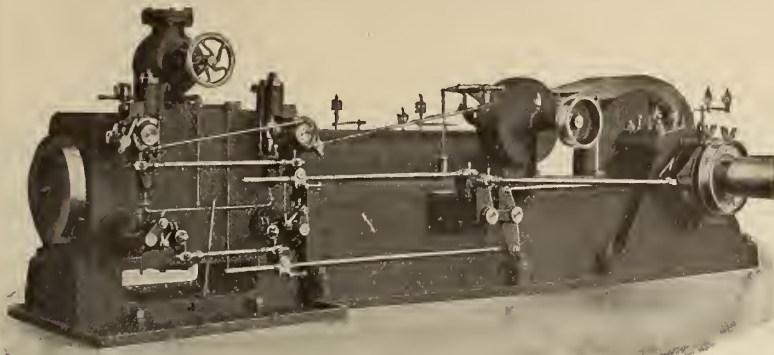
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Write for prices for  
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**THERE MUST BE A REASON**

They are giving satisfaction to all users, and are designed to give the highest possible efficiency, for direct connection, belted or rope drive.

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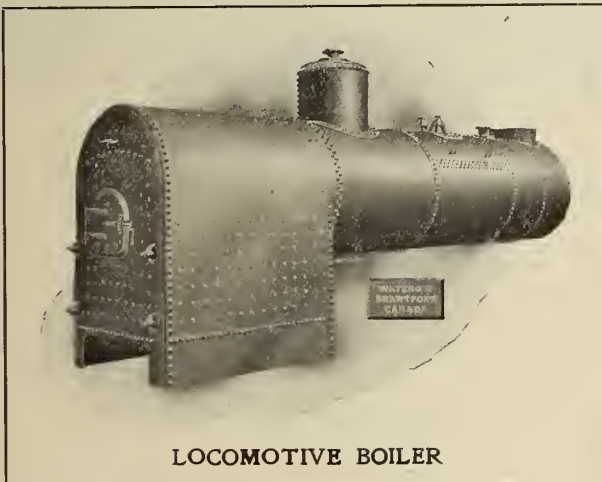
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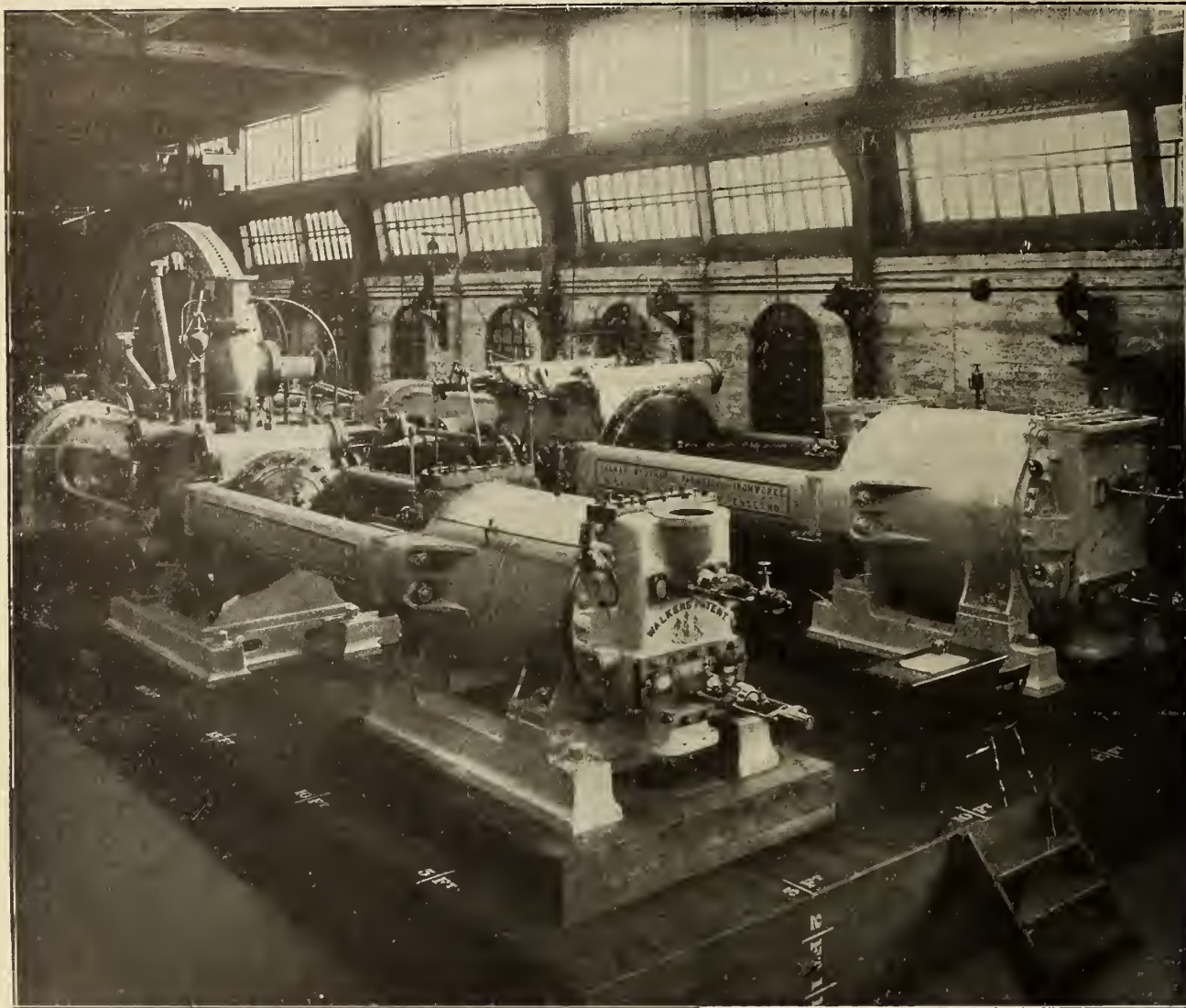
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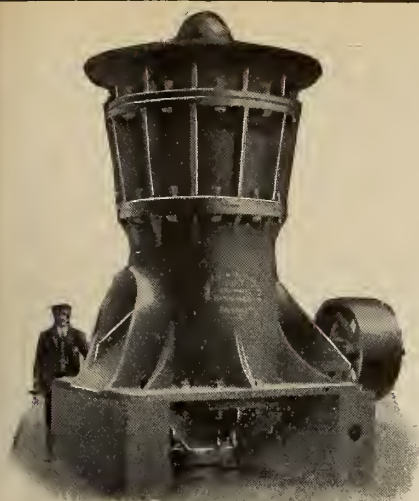
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CANADA LIFE BUILDING,  
MONTREAL, P.Q.

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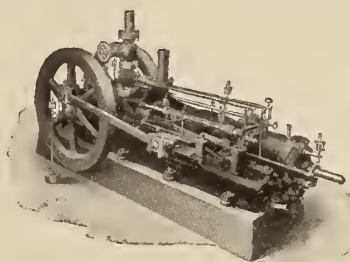
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**AIR Compressors**



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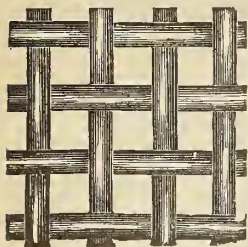
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BUILT BY BELLISS & MORCOM, Limited  
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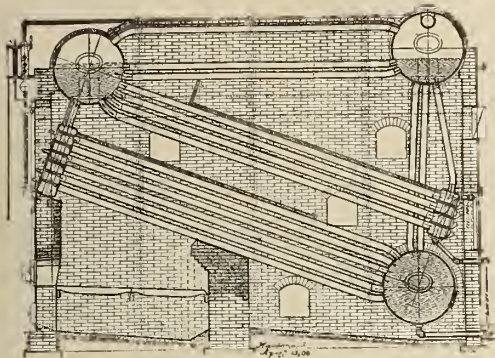
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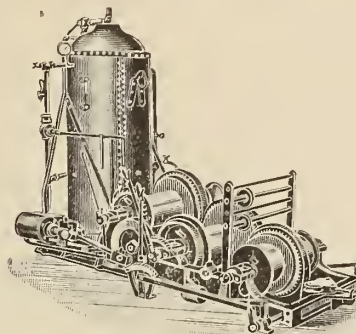
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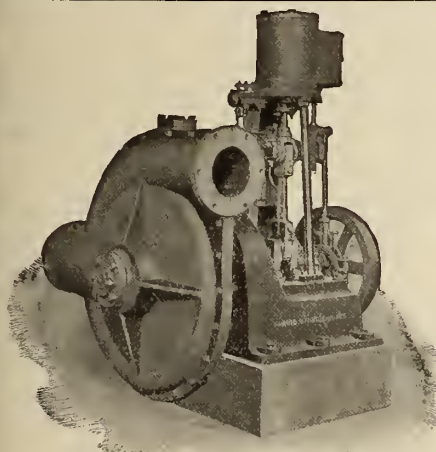
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**Centrifugal Pumping Machinery for various Industrial Purposes**

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## STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

The FLORY CABLEWAY SYSTEM is Superior to any on the Market

**Slate Mining and  
Working Machinery**

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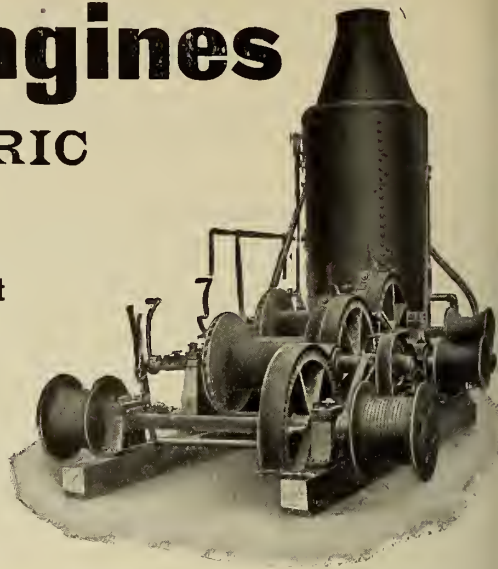
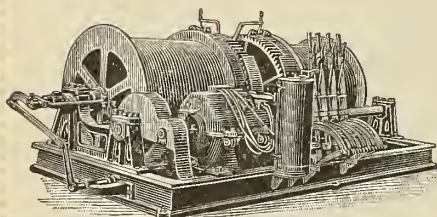
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MAY PROVE THE SOLUTION.

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All types and sizes. Complete outfits. Write for catalogue

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## Absolutely Dustless The Behrend System

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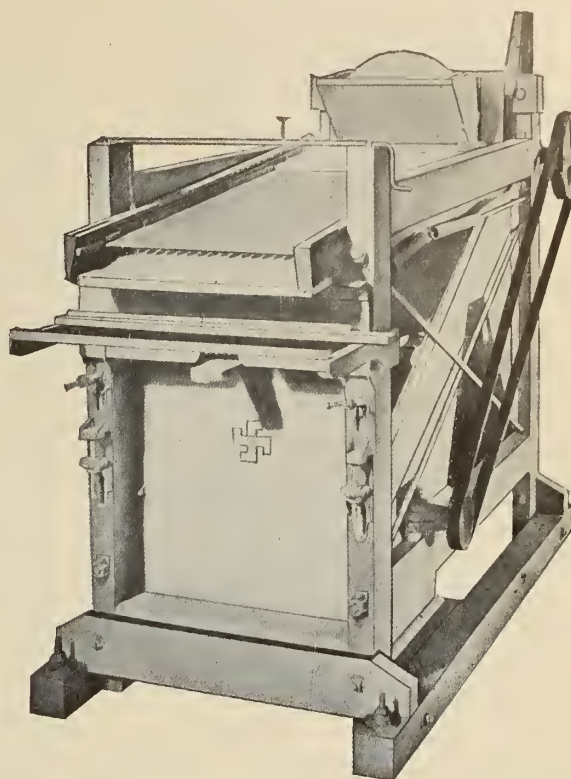
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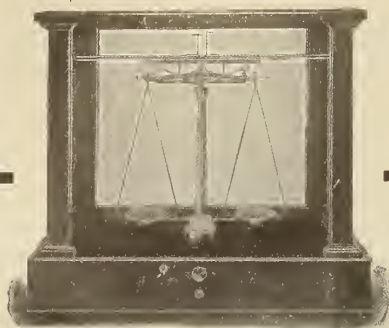
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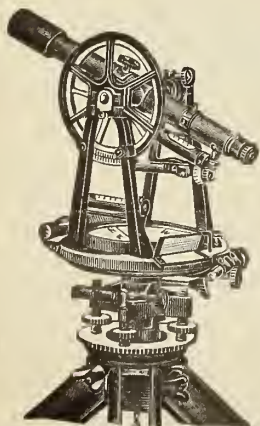


## CANADIAN MINING INSTITUTE

### NOTICE OF CHANGE OF ADDRESS.

The Secretary's Office and Library of the Institute have been removed to rooms 3 & 4, Windsor Hotel, Montreal, Que. Members visiting Montreal are invited to make use of the rooms for reading or writing purposes. Office hours: 9.30 a. m., to 1.30 p. m. and 2.30 p. m. to 6.00 p. m.

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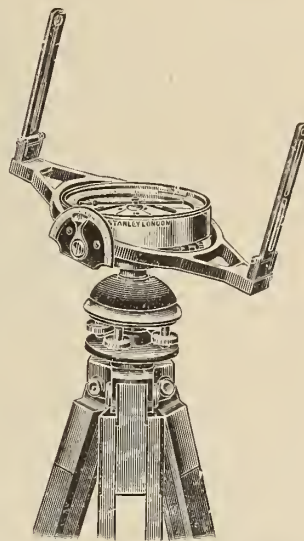
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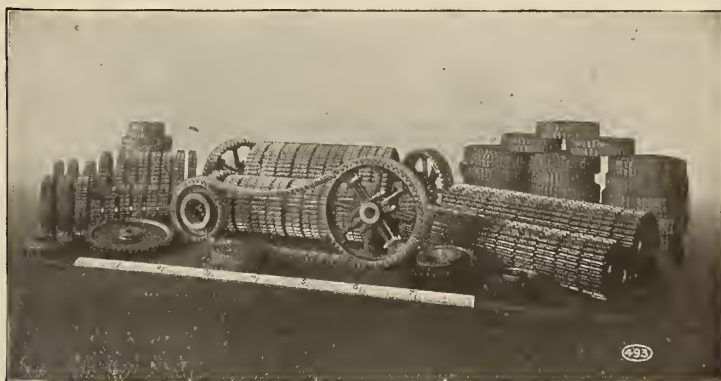
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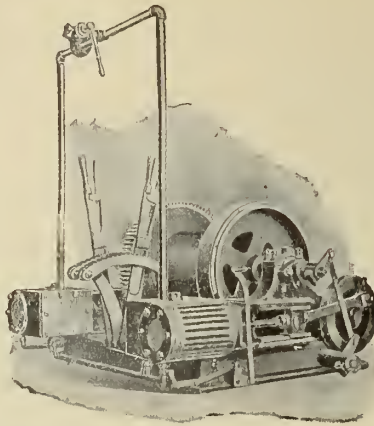
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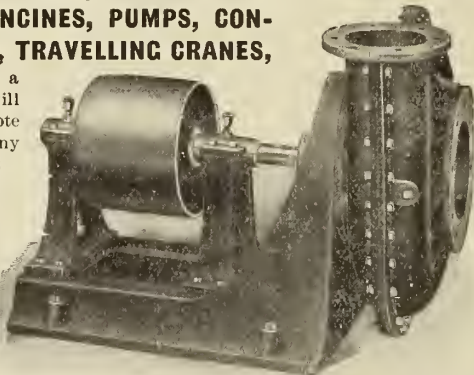
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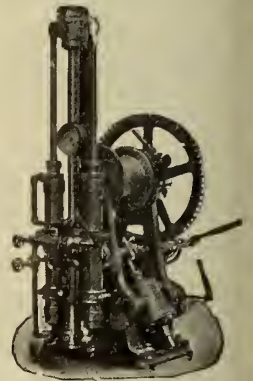
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, March 1, 1909

No. 5

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

**MINES PUBLISHING CO., LIMITED**

*Head Office* - - - Confederation Life Building, Toronto.

*Branch Offices* Montreal, Halifax, Victoria, and London, Eng.

*Editor:*

J. C. MURRAY, B.A., B.Sc.

**SUBSCRIPTIONS**—Payable in advance, \$2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, \$3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

### SPECIAL CONTRIBUTORS.

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**Mineralogy:** Professor W. Nicol, School of Mining, Kingston, Ontario.

**Mining:** S. S. Fowler, M.E., Nelson, B.C.; Frederick Keffer, M.E., Anaconda, B.C.; A. B. Willmott, M.E., Sault Ste. Marie, Ont.; J. C. Gwillim, M.E., School of Mining, Kingston, Ont.; J. Obalski, Inspector of Mines, Quebec; J. Bon-sal Porter, M.E., McGill University; H. Mortimer-Lamb, Sec. Can. Min. Inst.; John E. Hardman, M.E., Montreal; Fritz Cirkel, M.E., Montreal; George W. Stuart, M.E., Truro, N.S.

**Metallurgy:** Stafford F. Kirkpatrick, School of Mining, Kingston, Ontario; A. P. Scott, Dominion Iron & Steel Company, Cape Breton.

**Natural Oil and Gas:** Eugene Coste, M.E., Toronto, Ont.

## THE AMERICAN COAL INVASION.

The coal mine operators of Nova Scotia are facing a serious situation. The St. Lawrence market upon which the prosperity of the Province's collieries depends, is being systematically invaded by American coal producers.

The collieries of Nova Scotia furnish employment, directly and indirectly, to twenty-one thousand men. Last year (1908) the total production of coal exceeded six millions tons. Total shipments amounted to about five and one-quarter millions. Of this amount a large proportion, roughly two million tons, was shipped up the St. Lawrence to Quebec, Montreal, and intermediate points.

Against United States coal there is a Canadian duty of fifty-three cents per net ton. This, apparently, is insufficient to prevent the dumping of large quantities of American fuels into Eastern Canada. Neither does the advantageous position of Nova Scotian collieries, which are either on or within easy distance of tide-water, suffice to offset the cheaper cost of production in the United States. The collieries of the latter country have a domestic market that is fully developed. They can, therefore, afford to exploit Eastern Canada. They are in a position to make temporary sacrifices that would swamp Canadian competition. Even now their efforts are causing serious embarrassment.

The situation thus created requires immediate attention. Hasty restrictive legislation is not to be recommended. But there is unmistakeable need of action on the part of the Dominion and Provincial governments.

As pointed out by Mr. A. S. Barnstead, in our issue of February 1st, 1909, something can be done in the direction of lowering the cost of living in Nova Scotia. The Province is sadly in need of an agricultural population. Mr. Barnstead affirms that not five per cent. of the necessities of life is produced in the neighborhood of the mines, and this in spite of the fact that many of the collieries are surrounded by good farming and arable lands.

At a conference between the Government of Nova Scotia and the coal men of the Province, held on January 14th, the Government's representation promised that official aid would be given in any proper direction. It was pointed out, however, that the direction indicated above, namely, the reduction of the cost of living by means of the rehabilitation of the agricultural industry, was thought to be most desirable.

Without doubt a movement of this kind would help matters considerably. But concerted action on the part of Nova Scotian operators is the first requirement. If danger threatens all alike, then the time has

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arrived for a strong alliance between the Maritime coal interests. This need not be a combine. Rather should it be an operators' association, organized for the purpose of improving mining practice and lowering costs of production. Immediate good would result from this, and we believe that it would have the effect of gaining public sympathy.

It is suspected, with seemingly good reason, that there is a definite connection between the American raid upon our Eastern coal markets and the efforts of the United Mine Workers' of America to control the workingmen of Nova Scotia. This may be the case. If it is so, then one reason more is added to reasons already known that go to prove that the influence of that body is not desirable. Canadian workingmen are surely able to take care of themselves. The establishment of U. M. W. control in Nova Scotia would be an industrial and political disaster.

A fortnight ago the whole case was laid before the Hon. Mr. Fielding. The Federal Government is, therefore, in possession of all the facts. We are hopeful that effective measures will soon be promulgated. But, whatever happens, no one can assist the Maritime coal operator more than he can himself.

#### MENDELEEFF—CHEMIST.

The great Russian chemist, Mendeléeff, applied his brilliant genius and his extraordinarily wide knowledge to the development of his country's natural resources. His volume entitled "The Principles of Chemistry," illustrate this statement. The elaborate footnotes that occupy more space than the original text are, mines of information drawn from all sources. Written during the years 1868-70, the work was first rendered into English in 1891. It has passed through many editions, and has had a profound effect upon scientific thought and work.

Mendeléeff was one of the earliest and certainly the most brilliant exponent of the law of the periodicity of the elements. But he refused to permit the enticing field of pure science to engross his entire attention. To the genius of the philosopher, he added the practical wisdom and foresight of the true chemist. Everywhere he saw opportunities for applying the results of his laboratory researches, and always he urged his fellow-countrymen to exploit Russia's natural wealth for themselves. His life, indeed, is one grand argument against "secrecy in the arts." Had he been a lesser man, he might easily have become the Rockefeller of Russia. He worked as a man should work, and his name will live.

Mendeléeff own words are pregnant with inspiration and high idealism. To the younger generation of writers he writes thus: "The time has come to turn aside from visionary contemplation, from platonic aspirations, and from classical verbosity, and to enter the regions of actual labor for the common weal, to prove

that the study of science is not only an excellent education for youth, but that it instils the virtues of industry and veracity, and creates solid national wealth, material and mental, which without it would be unattainable. Science, which deals with the infinite, is itself without bounds."

#### CANADA AND AMERICA.

Merely for literary effect that unrestful person, Mr. Stephen Leacock, whose clarion colloquialisms last year set the whole British Empire on edge, has seen fit, in the last number of the University Magazine, to delete the International boundary. Mr. Leacock smiles (not without tears) at the whole American system of education. And in the term "American" he is pleased to include everything pertaining to Canada.

The young man, Mr. Stephen Leacock, is an astute and humorous person. He is not without guile; nor is he deficient in what, during his period of foreign aberration, he would have been coarse enough to denominate "gall." But an incidental lack he does display. He rarely takes pains to collect a little information before he writes. He merely gathers—like storm-clouds—and breaks.

When Mr. Leacock deplores several things, including the unanimously low literary taste of all of us, he wails over the "standardization" of university methods and men, he forgets that the system that has produced Mr. Leacock, or that includes him as one of its cogs, cannot be incontinently damned. Hence, moreover, the horrible unfairness of sweeping us Canadians into the cesspool of Americanism! The leaven of Leacock is ours alone! The Boundary must remain!

#### THE AGAUNICO MINES DEVELOPMENT CO.

In the Toronto Police Court, on Feb. 22nd, the Agaunico Mines Development Co. was fined \$300 for non-compliance with the Ontario Companies Act. The fine was paid. The representation of the Crown, after conference with the defendant company's attorney, permitted the case to end there. Here, also, we would be glad to drop the matter. But, alas! the Agaunico Mines Development Co. is not what it seems.

Last December copies of a prospectus were distributed by agents of the Fiduciary Company, Tacoma Building, Chicago. The name of E. J. Rosenfeld appeared as president of this charitable institution.

On the cover of the prospectus is pasted a passable imitation of a representation of weathered silver-bearing smaltite that appeared originally on the front of the Canadian Mining Journal. The contents of the prospectus have little or no bearing upon the actual value of the mine, and there are several pages of absolute lies.

Before giving a few samples of these we may remark that any project that needs bolstering and padding by



such absurd prospectuses, carries its own warning to the public. The Agaunico people know that they cannot afford to tell the truth about their mine. They therefore proceed to tell something else.

The capital of the company is \$5,000,000, of which \$1,500,000 was used "for the acquisition of the property and financing of the company. The Temiskaming-Cobalt Mine, which is the property described in the prospectus, is thus offered to the public for \$5,000,000. The impression is conveyed throughout the prospectus that the Temiskaming-Cobalt is not only a silver mine, but a gold mine. It is, of course, neither. It has produced either a negligible quantity of silver or none at all. It has, we believe, large showings of smaltite and cobaltite, which minerals are extremely difficult to market.

A cheerful person, S. W. Gilbert, signs a report which is accompanied by the most remarkable map that it has ever been our fortune to see. Mr. Gilbert after declaring that "operations up to date have been carried on upon only two parallel veins," signs his name to a map that shows a "belt" of silver, one mile long and six feet wide, that he describes as "a reservoir of solid silver."

Belt No. 2, according to the same charming fictionist, consists of a belt of gold "one to two feet wide." The gold belt is also pictured luridly on the map.

Mr. Gilbert, if he is still at large, should receive attention from a commission of alienists. So also should the eminent business men of Chicago who ask anybody to swallow this bosh.

We have no time to squander upon the remainder of this pamphlet. Gilbert's report alone is enough to prove that the promoters of the Agaunico Mines Development Co. are either fools or knaves. We are exceedingly sorry to see that Mr. D. B. Rochester of the Cobalt Lake Mining Co. has permitted his name to be used by these gentlemen from Chicago. Mr. Rochester has been long enough in Cobalt to know that Gilbert's report is a pipe-dream or worse.

Mr. E. L. Fraleck, quoted by the Agaunico people as their consulting mining engineer, protested vigorously some time ago and is continuing to protest.

As a valediction we dismiss the subject with the remark that if the Agaunico Mines Development Co. published the truth about this Temagami-Cobalt Mine, and the truth is not far to seek, they would not sell one cent's worth of it to any person of sound mind.

### CONFLICTING FIXTURES.

Much to the regret of many mining men, the dates fixed for the annual meetings of the Mining Society of Nova Scotia and of the Canadian Mining Institute overlap. A number of the members of the Institute had expressed their intention of attending the meeting of the Society; but this has been rendered almost impossible as the

first day of the Halifax gathering coincides with the first day of the Montreal convention.

In future matters should be so arranged as to obviate this regrettable coincidence. Both meetings are pleasant and profitable events in the world of mining and larger numbers of both bodies should attend both.

### EDITORIAL NOTES.

At the first annual meeting of the American Institute of Chemical Engineers, held in Pittsburgh, on December 28 and 29, Dr. E. F. Northrup read an instructive paper on pyrometers. Among other points, Dr. Northrup alluded to the distinction that must be made between the sensitiveness and the accuracy of a pyrometer. All pyrometers should be calibrated in actual degrees, Fahrenheit or Centigrade. Resistance pyrometers are now so perfected that all temperatures from that of liquid air to 1200° C. may be indicated and observed accurately. But the instruments, to give good service, require the attention of trained specialists.

Mr. W. C. Ralston, a citizen of San Francisco, has been nominated for the office of vice-president of the American Institute of Mining Engineers. Mr. Ralston is a politician and a broker. The Mining and Scientific Press has raised its voice in protest against his nomination. Our contemporary contends, with perfect fairness, that, although the membership of the institute is heterogeneous, it is essentially what its name implies—a society of mining engineers. Hence its officers should be mining engineers.

### PERSONAL AND GENERAL.

Mr. J. W. Evans, M.E., lately of Cobalt, has opened an office in Room 42, Lawlor Building, corner King and Yonge Streets, Toronto. Mr. Evans was one of the pioneers of Cobalt, and has a thorough professional knowledge of the district. He is also familiar with the new districts of Miller Lake and Gowganda.

The American Grondal Kjellin Co. has installed a testing plant for the concentration of iron ores according to the Grondal system at Sheridan, Pennsylvania, where ores will be received and tested free of charge.

The Grondal processes have had such an eminent success in Europe, where at present more than thirty plants are in operation, that it is time they were better known and more thoroughly understood by the iron ore producers in this country.

Mr. R. L. Broadbent, of the Dominion Geological Survey, has gone to British Columbia to make a collection of the ores and minerals of that province for the forthcoming Yukon-Alaska-Pacific Exposition at Seattle, U.S.A. The mineral interests of British Columbia being so large, the Government will make a special effort to see that they are well represented. Mr. Broadbent has had a wide experience in collecting minerals for expositions. He was in charge of this branch of the work for the St. Louis, Dublin, Milan and other great expositions of the past few years.



## DEPTH OF ASBESTOS DEPOSITS.\*

By Fritz Cirkel, M.E., Montreal.

"Asbestos found at a depth of 400 feet." This is the latest important news from that famous asbestos district, the Eastern Townships of the Province of Quebec. This intelligence is significant from the fact that the deepest asbestos mines are only 200 feet, hence the question: Where was it found? When the Black Lake Chrome & Asbestos Company, near Black Lake, had finished deepening their shaft to 400 feet for the purpose of exploring their great chromic iron ore body, they ran in a drift through a deposit of chromite and serpentine, and finally landed in asbestos veins of from  $\frac{1}{4}$  to  $\frac{1}{2}$  inch thickness, of great silkiness and flexibility. This event at first sight would seem insignificant, were it not for the fact that the question of depth of these deposits is one of greatest economic importance.

Before entering into a discussion on the subject under consideration, I wish to state here that the question of the permanence and persistency of asbestos deposits is a delicate one. It forms a subject upon which hardly any geologist or engineer familiar with the existing conditions has ever ventured an opinion; yet from an economic point of view it is highly essential that the matter should be given close attention, since the future of that district, which furnishes almost solely the world's market with asbestos, depends a great deal more upon the depth of these deposits than on the opening of new mines; but if the writer ventures an opinion on this subject, based primarily on observations in the field, it is done more with a view to stimulate a discussion than to come forward with new and extravagant theories. Now, it seems strange to the miner who is familiar with any other kind of mining than the exploitation of asbestos deposits, that a district with a history of over 30 years has no record of any kind regarding the character of these deposits below a depth of 200 feet. As a matter of fact, there is no visible evidence in any asbestos mine of the extension of the deposits below a depth of 225 feet, and it seems also strange that this discovery should be made accidentally in a mine of another class. However, if we consider the methods employed in the exploitation of asbestos mines, and also the difficulty, or rather impossibility, of testing the ore bodies by diamond drilling on account of the fibrous nature of the rock and mineral, it is at once apparent that this lack of knowledge is due to causes arising solely out of the peculiar occurrence of the mineral.

To treat the subject under consideration from a practical standpoint, it will be necessary to consider the results so far obtained in the present depths, and see what kind of deductions, if any, can be made therefrom. In conjunction with this, reference must undoubtedly be made to the genesis and also to the structural geology of the deposits, as well as to the formations with which they are associated.

When a new asbestos company intends to start operations, the first questions always asked are: How much is there of the mineral available, what does it cost to get it out and to refine it, and what profit is there in it? These are the paramount questions of the day in all mining enterprises, and the more briefly and decisively these questions are answered the more intelligent they are to the general public and the more effective are the actual results. In almost any other class of mining the methods of exploitation are char-

acterized by the preparation for stoping or winning of the mineral through shafts and drifts. Diamond drilling is frequently resorted to in case more light is needed on the extent of the deposits, either in a lateral or vertical direction. All these means are employed in order to arrive at a satisfactory conclusion as to ore in sight before any large amounts of money are spent in expensive mining and milling plants. They enable the examining engineer to draw pretty safely his deductions.

But in asbestos mining the case is different. Here the extensive but mostly low grade ore bodies do not admit of underground working such as is generally employed in mines of other classes. In the opinion of the writer only the richer asbestos mines can follow the great example of underground mining, such as was inaugurated for the first time at Thetford by Mr. George Smith, the general manager of the Bell Asbestos Company.

As a general rule, a quarry is started on a promising spot, and this quarry is gradually widened and deepened as work progresses. Almost all the virgin properties have only surface outcrops to show, and in a few instances a pit, say 15 or 20 feet down, is all that is offered for the purpose of arriving at a valuation of this property or at a satisfactory estimate of ore in sight.

It will be asked here: Why not open up the property by shafts, sunk at different places of the ore body? An answer to this question is found in the following statement: The most irregular character of asbestos shoots, both laterally and vertically, does not admit of an intelligent exploration by deep shafts. For instance, if a shaft is started on what is considered an excellent surface showing, it may be expected that just under the surface one of these lean shoots is encountered accompanying rich deposits, and if it is found that by chance this lean shoot extends vertically for some distance, the conclusion to be drawn from these conditions would certainly be not favorable, whereas if this shaft had been sunk perhaps, say just 25 feet away, the results might have been just the opposite. A striking example of this is the shaft which was sunk by the Bell Asbestos Company twelve years ago to a depth of 137 feet in the westerly part of this property. The ground penetrated did not pay to work, and the deduction was made that that part of the property was of little value. How far this conclusion was off the mark is demonstrated now by the excellent showings exposed through the great underground workings, and that part which was originally condemned has proved to be, the writer ventures to say, by far the richest asbestos ground ever discovered in the district.

Now, what justifies then the talk of depth of these deposits if no exploitation work in shafts and drifts or through diamond drillings is done? It is only the experience in other asbestos mines that guides us in this instance, and, so far as the records show, comparatively few mistakes have been made; and it may here be stated that of all the mining enterprises in all classes and denominations, asbestos mining in the Eastern Townships has the lowest percentage records of failure.

\*Paper read before the March meeting, 1909, of the Canadian Mining Institute.



The experience in the Canadian asbestos mines teaches us:—

1. That the asbestos occurs as "vein" or "slip" fibre in pay shoots, setting through the serpentine in irregular fashion, alternating with lean ore or serpentine poor in asbestos.

2. That often rich pay shoots are encountered when approaching a granitic dike or near the contact with the schist formation.

3. That the quality of asbestos at a depth of 200 feet and, as has lately been found in the shaft of the Black Lake Chrome & Asbestos Company, at a depth of 400 feet, is the same, or nearly so, as found on the surface.

4. That wherever there is a large lateral extension of serpentine, and in the latter an asbestos pay shoot the lateral extension of which on the surface is more

take the form sometimes of permanent displacements, and may cut off towards depth an asbestos deposit which on the surface showed all the requisite qualities of a pay shoot.

In the serpentine belt which stretches—as the writer will show later in a new treatise on "Asbestos"—from Range 3, Broughton, with a few surface interruptions right through the Townships of Broughton and Thetford-Black Lake area, interesting studies can be made regarding the permanence of asbestos deposits; but as time does not permit me to go into all of them, a few remarks shall here be made.

At the "Quebec" mine the fibrous rock found on the surface in small shallow pits continued both laterally and vertically along the contact with the schist formation, and the rock is now mined in a quarry about 300 feet long, 125 feet wide and 65 feet deep. At the Broughton property the fibrous serpentine which ap-

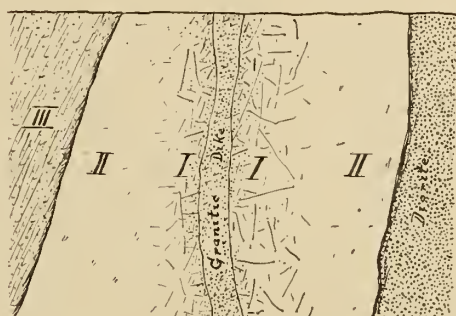
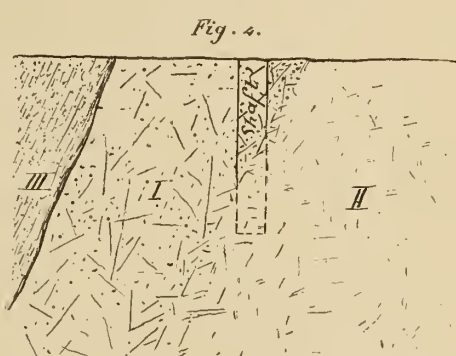
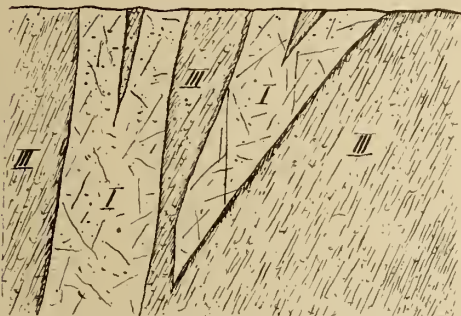
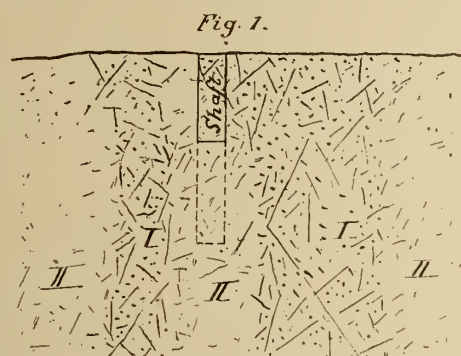


Fig. 3.

Fig. 4.

Figs. 1 and 2.—Shafts started in good asbestos ground on surface, landing in poor ground.

Fig. 3.—Productive asbestos deposit cut off by country rock.

Fig. 4.—Rich asbestos ground close to granitic dike.

LEGEND: I.—Productive asbestos shoots. II.—Lean serpentine, non-productive. III.—Cambrian schist and slate.

than 100 feet in both directions, this pay shoot almost invariably, with occasional interruptions of lean serpentine, continues towards depth.

5. That exploration work in shafts alone without the running of large roomy drifts in connection with such shafts, is entirely misleading, and in the majority of cases does not materially add to the value of the property.

Now I must repeat here that the lateral extension of the serpentine as under No. 4 is an important factor in the continuity of the deposit, for the reason that small strips or lodes of serpentine are contaminated and interrupted in their continuity by traplike portions of the adjacent country rock, which are never expected to be present in an extensive development of serpentine (except granitic intrusion) like that of Thetford and Black Lake. As experience has shown, this interruption in the narrow serpentine lodes may

pears only in a few places on the surface was found to extend all along the contact, and the quarries are now down 85 feet. In both cases the fissured and fibrous condition as observed on the surface was found to continue at depth, and although there may perhaps be a change once in a while in the quantity of the vein fibre—like in the "Broughton"—this does not in any way influence the general conditions governing the occurrence towards depth in these places.

The great quarries of the "King Bros.," the "Bell," the "Johnson," the "Beaver," all at Thetford, and also the deep quarries of the "British-Canadian," show conclusively that towards depth no marked change in the quality or richness of the asbestos shoot is observed; indeed, at a depth of 200 feet they appear as continuous and as rich as ever, and taking in now the new discovery of asbestos in a depth of 400 feet in the shaft of the Black Lake Chrome & Asbestos Company, we



certainly have reason to believe that asbestos deposits have no shallow depth.

But, as I said in the beginning of this paper, there are other and, I believe, more important reasons than those mentioned above, namely, those observable after an intimate study of the geological conditions governing these occurrences.

It is now pretty well established that the serpentine of the Eastern Townships, the mother rock of chrysotile asbestos, is a secondary rock, that is to say that is is the alteration product of olivine—diorite—a rock which has its origin in the interior of the earth and broke at one time through the earth crust to the surface. It can be conclusively shown that in nearly all cases this anhydrous olivine rock was changed gradually into serpentine or a hydrous silicate of magnesia, and that subsequently through the action of certain agencies fissures were formed and filled with asbestos from solution which gave rise to the ultimate crystallization of the fibre.

For the purpose of a better conception of these physical and chemical changes and their bearing upon the persistency of the deposits it will be necessary to state briefly how all these changes in all probability were produced.

Sterry Hunt\* shows that the alteration of olivine into serpentine would result in an increase of volume amounting to over 30 per cent. Now, admitting that some of the silica or even of the material is lost in the process of hydration, there must be still a great expansion at some time of the process, and this expansion must at the same time mean increased pressure in the interior of the rock, since the surrounding formation undoubtedly did not allow of an easy expansion through increase in volume. It was thus impossible that fissures could have been formed at this stage of the process.

There seems to be no question that as soon as the process of alteration was finished, a readjustment in the rock masses took place, and this readjustment resulted in the formation of joints and slickensides such as we find them to-day in the mines, and not, as is generally supposed, in the formation of fissures. This theory is substantiated by the fact that in the mines at Thetford numerous places can be seen where these fissures (asbestos veins) cut right through joints and slickensides. The next question arises, then, how have these fissures been formed? Was it through shrinkage due to a loss in silica or due to shrinkage of the rock mass through cooling? Now, if these fissures were formed through the loss of silica, they would have been formed during the process of alteration, that is, before the joints and slickensides were formed, but that this would have been impossible is simply explained above.

The most rational explanation, and the one which seems to gain most support, is the formation of cracks caused through cooling and shrinkage of the rock masses similar to the formation of cracks through shrinkage of a gelatinous mass of iron carbonate, as in the so-called septarian nodules of clay iron stone, as suggested by Merrill. However, it is also probable that the intrusion of those granitic dikes so frequently met with in the serpentine masses has caused or facilitated to a great extent the formation of numerous fissures in the immediate proximity of these intrusions by rapid dehydration through the agency of heat. The fact that

very frequently an accumulation of asbestos veins can be noticed in approaching these intrusive dikes seems to substantiate this theory.

Now, it is obvious, from a geological point of view, that all these great radical changes which were perhaps brought about during long geological time intervals, took place not only on or near the surface, but also deep down in the bowels of the earth. It is impossible to imagine that the changes in the character of the rock, viz., the alteration into serpentine, the subsequent readjustment of the rock, the forming of fissures and the ultimate filling of the latter with a crystallization of the serpentine solution, should have been confined only to rock portions near the surface, hence we are justified in assuming that these radical changes must have affected the whole system, that is, they must have extended to great depth. We cannot at this stage of investigation conceive of any influence coming from the surface or being exerted near the latter which could have created such conditions.

There exists a great difference in the quality of serpentine and the fibre found in the Thetford and in the Broughton district, and much interest is being manifested at present in the question as to whether there is any relation between the two occurrences. Recent investigations have shown—and this is amply supported by the discoveries which have been made during the last year or two—that the Broughton serpentine belt, which occupies a straight narrow strip in Broughton Township and in the easterly part of Thetford, conformably deposited with the Cambrian schists, continues with few small interruptions into the great serpentine knoll around Thetford village, that further a gradual change can be noticed from the "slip fibre" quality as at Broughton into the vein fibre as found in the westerly part of Thetford.

This evidently goes to show that there exists a genetic relationship between the two occurrences, and it seems very probable indeed that the serpentine belt over its whole extent has its origin in one common source, but that at Broughton, where the "slip" asbestos fibre is produced, additional changes and readjustments have brought about the prevailing conditions. In order to make this clearer a first attempt has been made by the writer to tabulate the successive changes which the original rock in all probability underwent until its present state.

1. Intrusion of diorite-olivine through the earth crust from below.
2. Gradual alteration of the rock to serpentine through hydration, and perhaps loss of silica, increase in volume.
3. Slow readjustment of the rock masses, resulting in the formation of joints and slickensides.
4. Subsequent formation of fissures as receptacles of asbestos fibre, through shrinkage of the rock and also through injection of granitic dikes.
5. Infiltration of serpentinous solution from the sides of the wall through process of segregation and subsequent slow crystallization of chrysotile.
6. Second slow readjustment of the magnetic rock mass and formation of "slip" fibre.

The writer has gone more fully into the question of origin than was originally intended, but this was deemed necessary in order to follow step by step the alteration and successive changes of the original rock mass, and also to show that these most radical changes cannot have affected the serpentine near the surface alone, but also must have penetrated to greater depth.

The agencies which have brought about all these

\*Mineral Physiology and Physiography, p. 506.



changes must have been steadily at work for enormously long periods, and their cumulative effects are crystallized in what we possess now in the shape of economic asbestos deposits.

The actuating dynamic forces have been of such great drastic effect that no man, it may be said, has ever observed their equal, because the changes have been brought about so slowly or so deep down within the crust that no direct observation is possible, and

for this reason we can only infer the mode of procedure by examining closely the results. To what depth then these rock masses have been affected by all these changes to produce what is now known as asbestos rock must remain a matter of surmise, but, judging from the results which lie now before our eyes, I venture the opinion that these workable asbestos deposits extend to considerable depth, probably to several thousand feet.

## THE SILVER ISLET VEIN, LAKE SUPERIOR.

By Walter McDermott, Past President.

Paper read before the Institution of Mining and Metallurgy.

In presenting the following reprint of an old article on the Silver Islet Mine, the writer offers as excuse the fact that the occurrence of native silver associated with nickel and cobalt may prove of some interest in connection with the present experience of mining at Cobalt; also that the influence of graphite on the silver deposition, together with the existence of gas in the ancient rocks of Canada, may receive some explanation in the paper of Mr. Hixon on a "Theory of Volcanic Action and Ore Deposits." The very age of the article may be considered as some reduction of the fault of its reproduction in the face of the general rule of the Institution as to the acceptance only of original papers.

In explanation of certain portions of the article, and of the remarks as to the proper attitude of mind for mining men on theories of ore deposition it is advisable to mention that the paper was written particularly to oppose the views of an authority from Nevada who had denied the possibility of any connection between the graphite and the silver, challenged the production of any evidence to the contrary from any other mining country, and maintained that the proper direction to look for silver in future was in the slate country, not within or near the diorite.

As regards the character of the gas met with, the suggestion of its being carbonic oxide rather than the more obvious assumption of carburetted hydrogen, cannot be taken as settling the question; although it can be stated that the alternative was considered at the time.

From the private manner in which this property has been owned and worked very few details of the mine have been made public; although the vein, as developed, is in many respects remarkable and the conditions of occurrence of the silver are well worthy of attention. In the following paper it is proposed to give an account of some of the most striking features of the vein, with a comparison of the conditions determining the deposit of the silver with those in mines of other countries.

The position of the Silver Islet vein, on a small bare rock, 70 ft. by 80, three-quarters of a mile from shore and exposed to the full sweep of Lake Superior, has controlled the extent of the workings. It is not proposed here to describe the difficulties to be overcome in order to work a vein actually under water at its outcrop on a bare rock over which the waves of Lake Superior freely washed in every storm. Suffice it to say that at a great cost the matter was accomplished, an artificial island built up of cribs and thousand of tons of rock, a watertight coffer-dam sunk, and a shaft and customary workings opened.

This opening of the lode by a single shaft has limited the workings, so that although the mine has been in

active operation some six years the present depth is only about 650 ft., with a maximum extension of about 500 ft. From this small excavation, but really confined to a mere portion of it to be subsequently described, about \$2,500,000 in silver have been taken; and there is no reason why as much more may not be hereafter extracted.

The immediate country rock around Silver Islet consists of a very silicious slate, with a slight dip to the east. Through this slate a number of diorite dykes cut, running in a general north-easterly direction. These dykes, withstanding better than the slates the action of the air and water, are left standing in places as small islets or as a backbone to larger islands, in the vicinity of Silver Islet, which is itself one of the small crags of diorite left above water.

When work was first commenced on the rock, the white, clearly-marked vein could be distinctly seen under a few inches of water, cutting at right angles across the dark body of the diorite dyke, and thus having a north-west strike.

In the mass of the dyke a strong branch vein east of the main lode, and diverging to the east, could be also seen; and south of the junction of these two, a strong spur shot from the vein diverging to the west.

In addition to these two a number of smaller strings or leaders could be seen leaving the body of vein matter, but falling into it again at a greater or less distance. About 20 ft. to the south of the junction of the east and main veins, the diorite was found to be strongly impregnated with graphite, giving a black, coarsely granular, friable character to the whole rock so changed.

The walls of the vein when cutting this rock were smooth and well defined often exhibiting beautifully polished grooved surfaces, perfectly black and soiling the fingers when touched; occasionally small nodules of pretty pure plumbago occurred in the walls, some of these weighing several pounds.

The zone of this graphite impregnation extended south in the dyke for a length of about 100 ft., with an average width of about 40 ft., occupying the entire space between the east and the main lodes at this point, and extending in places a few feet outside of both.

The general form of the zone was an irregular pear shape, with the small end north, in correspondence with the approach of the two veins to each other. The mass of gangue itself consists of an irregular mixture of white and salmon coloured crystalline calcspar, carrying also carbonate of magnesia; and, in the colored portions at least quite a proportion of manganese, probably as rhodochrosite, indeed, distinct crystals of that mineral have been observed.



With the calespar, irregularly distributed, are patches of quartz and scattered crystals. As in most vein gangues the character varies, being in places highly crystalline and at other points finely granular, while the proportion and depth of color of the pink spar and the distribution of the quartz add to local differences, and after experience become accepted as indications either favorable or otherwise to the occurrence of silver.

The width of the vein varies, but will average from 5 to 6 ft., though at one point increasing to 25 ft., and at another pinching almost out.

At certain parts of the lode "vuggs" are frequently met with, usually lined with crystals of calespar, quartz, and often containing clay, with varying quantities of iron pyrites, galena, zinc-blende, and argentite. The silver occurs mostly native, in grains, threads, or massive, rarely crystallised; also as sulphide of silver massive, or in leaves and well-formed crystals.

Associated with the silver are found iron and copper pyrites, galena, zinc-blende, niccolite, smaltine, and occasionally stephanite and pyrargyrite have been observed.

The form of distribution of the silver is in patches and streaks from 1 in. up to 2 ft. in width and from a few inches in length up to 20 or 30 ft. These masses occur either irregularly scattered, or arranged in broken lines for a distance of 50 or 60 ft.

Many of the pockets consisted of almost massive silver, with so little intermixed rock that the mass flattened under the hammer, and would remain shattered but firmly clinging after a blast.

The fact most striking to one who examines the parts of the vein from which the most valuable ore has been extracted is the evident connection of the deposit of the silver with the region of graphite impregnation of the wall rock, and this point will be readily conceded on the following facts:—

The east vein was found in sinking to drop towards the main lode, and at about 300 ft. in depth a junction occurred.

The plumbago was found to decrease in width as the veins neared each other, and at length, at about 360 ft., it suddenly cut out on a floor, and when the graphite ceased the silver was found no more.

The east vein itself received the benefit of the graphite, and yielded much rich ore until it fell into the main vein. When branches or small strings of the vein occurred in the plumbaginous rock, silver was generally found in them, often as a sort of thin plate between the spar and the graphite walls, and outside of the veins the graphite rock itself frequently carried silver.

The west vein, lying under the footwall of the main vein, joins the latter as already stated, the plane of intersection dipping off more and more to the south as depth is attained, at the 420 ft. level the two veins running parallel for over 100 ft.

It has been in the vicinity of the junction of these two veins, and within the body of the plumbago ground, that the immensely rich bunches of silver have apparently congregated in the upper levels. The dyke itself dips to the south, and the run of silver dipping in the same direction has always remained within the diorite rock. North and south of the dyke in the slate, the vein has so far proved itself incapable of carrying silver.

A few scattered small patches of silver have been met with, but the quantity has been so small and the occurrence so seldom, that practically all past experience would pronounce the slate as unproductive. The same term, indeed, might almost equally well be applied to

those parts of the diorite which do not contain graphite; but the graphite has not been found in the slate at all.

The west vein in the upper levels yielded very rich ore while running in plumbaginous rock, but on being followed out into clean, diorite, ceased suddenly to produce. The vein is not devoid of metallic minerals, either in the slate or in the normal diorite.

Galena and zinc-blende are found plentifully scattered, but neither of these minerals carry more than forms a mere trace up to two or three oz. of silver to the ton when found outside of the plumbago ground. Within the silver bearing portions of the vein both the lead and zinc-blende are usually rich in silver, in some cases the latter metal appearing to be contained within the ore as small disseminated grains of native silver, while in other instances the silver appears to be in regular combinations as isomorphous sulphide.

This rule, however, is not by any means universal, for occasionally patches of galena or zinc-blende are found in close proximity to rich bunches of silver, and yet are almost devoid of the metal themselves. The other fact, viz., that outside of the plumbago ground the galena and zinc-blende are practically without silver has so far been without exception.

The observation of the well-defined limits of the graphite within the diorite naturally led to the supposition that the mass, being in the form of a detached deposit, further pockets within the dyke might be fairly expected in sinking. The occurrence of graphite in Cumberland as large pockets within the trap-rock lends additional force to this belief. The expectation has in a small degree been already realised.

At a depth of nearly 200 ft. below the upper mass a small isolated patch of plumbaginous diorite was found; and about 60 ft. again below this a hard pocket was met with. Neither of these last two was of any great size, the lower and larger being only about 9 ft. in length, but it is a remarkable fact that in both cases some small streaks of silver were met with, although in the ground between and above no trace of native silver had been observed.

While treating on the subject of the graphite, another occurrence apparently connected therewith may here be appropriately mentioned. At a depth of about 360 ft. it was found that many of the "vuggs" were filled with an inflammable gas. This gas, either opened upon in volume by the exposure of a large cavity or issuing under pressure from a fissure in company frequently with water, was found to burn freely, and from its negative qualities and the color of its flame, was set down as carbonic oxide.

In some cases, especially in the lower levels, the volume of gas contained under pressure was really startling, and jets of flame many feet in length were maintained for hours at a time.

In one case a flame was thrown 40 ft. along the top of a level from the sudden breaking into and the ignition of one of these pent-up reservoirs. Some men were seriously burnt in this instance, and after the flame had somewhat subsided it became possible to creep along the floor of the level and plug up the drill hole from which the jet was issuing in such manner as to leave only a small flame burning.

This regulated jet burned steadily for about six weeks before the supply of gas was exhausted. The origin of the gas has been attributed in some way to the carbon of the graphite ground, and is accepted as a further indication of the probability of large masses of plumbago below the present workings.



Whether the gas it at present forming, or has remained pent up for ages within the cavities of the rock cannot be stated with the present knowledge of its occurrence.

The only fact bearing on the question of origin so far observed is that at the part of the vein where the gas was first seen an evident decomposition of the vein matter was taking place, the rock being honeycombed, softened and generally changed in character, the change having been accompanied by a deposit of well-formed crystals of silver glance, galena and zinc-blende. This, however, was only observed at one or two points in the vein, and may merely indicate the present formation of geodes within the veins, without connection with the origin of the gas found filling these cavities.

The water percolating through the fissures of the vein appears to be clear, pure and free of acid elements, as indeed might be expected in passing through a calcareous gangue. No analysis has, however, been made of the water. In boring with the diamond drill at a depth of 300 ft. below the lowest working, gas and water were met with again.

In recapitulation of the conditions under which the precipitation of the silver seems to have taken place, it will be observed that the determination of the deposit is in accordance with most of the conditions accepted as generally favorable in other mining districts.

In some respects every mining region is a law only unto itself, but there are certain generally accepted principles that apply with more or less force to all. It would be extremely foolish for a person to go from one mining country to another and apply a local experience in the first strictly to the second without regard to actual observation in the latter.

An engineer of experience will always, in the first place, discover all he can of the actually observed facts, and if he can then make these facts chime in harmoniously with any theory of his own, he will feel confidence in directing his explorations accordingly. If there be a want of harmony between facts and theory, the practical man bases his operations on the former, and keeps the latter to himself until circumstances are more favorable.

The past experience at Silver Islet has been that the vein is only productive within the diorite dyke; that the limits of the productive portions of the vein within the dyke are determined by the region of plumbago impregnation, both in horizontal and vertical extension; and that the said productive portions of the vein are within what may be taken as the influence (if any) of the junction of an east and a west vein with the main lode.

In the following extracts from Van Cotta's treatise on ore deposits it will be seen that all the conditions named above are generally accepted as favorable to the deposit of ore; so that any explorations based on the acceptance of these conditions has not only the weight of former experience as a justification, but is in accordance with such generalization as men of science have so far deemed it proper to make.

Of course it does not necessarily follow that even should the same conditions be again encountered, immense deposits of silver will be met with; but the chances are so greatly in favor of such a result that the search for similar conditions is the only rational method of exploration for the future.

Van Cotta, p. 44.—"The union of branches into a single lode or the reverse, the splitting up of a lode into several branches, has been frequently assigned as the richness or poverty of the same. The fact is indisputable."

That the influence of the country rock is great, and the passing of a vein from one rock into another is attended with changes in the extent of ore deposition, and consequently that a junction of two different rocks is a favorable condition, we have the following remarks from Van Cotta:

Page 50.—"Around Freiberg the lodes in general, without distinction in regard to the character of the formation, have attained a development favorable to mining only within compact rocks in which feldspar or quartz hornblende, pyroxene, as also carbon (graphite, anthracite), or carbonate of lime, form an essential ingredient. Although to be sure the lodes are not always favorably developed in rocks conducive to a deposit of ore, and are frequently even barren of ores within them, still, when they do contain ores, it is only in these rocks; while on the other hand they are always barren and never contain ores in the unfavorable rocks."

Page 48.—"At Kaafjord, in Finland, the country rocks consist of diorite and arenaceous clay slate. In the first the lodes are very rich in copper, in the last they are contracted and unproductive."

Page 49.—"In South Carolina the country generally is itacolumit, tale and mica schists, and gneiss, with dykes of greenstone, phonolith, etc. Where a lode comes in contact with a dyke, intersects it, or is broken by it, a local enrichment has always taken place. This enrichment is often so considerable that many lodes have only been productive in such places."

Page 466.—"The copper deposits occur developed at the junction of the diorite and limestone, or diorite and garnet rock."

Page 418.—"In Cornwall, by the passage of veins from one rock into another, a change usually takes place in the amount of ore, in which the portion of lode at the junction is often the richest."

Page 46.—"Near Freiberg the veins are enclosed in mica schist, which contains an irregular layer of black graphitic schist. The veins have only been found productive in the black schist. In the common mica schist they are poor."

Page 265.—"We have a very fine example of a bed-like impregnation formed from a lode fissure, which principally follows but one rock, and that a coaly one, like that in which the quicksilver ores in Idria occur, and also similar to that of Braunsdorf, near Freiberg, which exerts such a favorable influence on the lodes traversing it."

Page 507.—"Quicksilver beds in bituminous shales of Idria and St. Anna in Austria, also at Vallalta near Agordo."

Page 400.—"At Almaden Quicksilver Mine, Spain, the immediate wallrock is usually a black carbonaceous slate, and quartzite with which hard and fine grained sandstones and slates alternate, but contain no ores."

In addition to the examples cited above as to the favorable effect of carbonaceous matter in the country rock, some instances from the neighborhood of Silver Islet itself may be here alluded to.

At the Duncan Silver Mine, native silver with zinc-blende, galena and iron pyrites, occur in a large calcespar vein. The country rocks are diorite and slate; parts of the latter are of a black carbonaceous character, and such parts have been observed to be favorable to the occurrence of silver.

At the old Thunder Bay Mine the same fact was observed, and on a sudden change in the country rock the vein was lost, either by a throw or actual cessation of the vein.



At the Jarvis Island Mine a strong calespar and barytes lode crosses the slates and cuts a diorite dyke. In parts of the dyke the walls showed plumbago, and in such portions the vein usually yielded rich patches of ore.

In the Pie Island vein, strings of quartz in black carbonaceous slate are rich in native silver. At the Singleton Mine a bituminous substance is reported as existing in the wall-rock.

As a summary of the examples selected from Van Cotta, the following further extracts may be given, as the generalization to be drawn:

Page 59.—“There are certain rocks which can, locally at least, be termed ore-carriers, while others are almost the reverse of this. The modifying influences of the country may be of themselves so slight that they escape observation; they may still, however, become perceptible through combination with other causes. For example, the effect of the junction of two lodes may of itself remain imperceptible, and even so the effect of a particular enclosing rock, but where they both meet—that is, where the line of junction of the former traverses the, also but slightly favorable, zone of rock—a very perceptible enrichment takes place.”

Page 53.—“We may consider it proved from all these examples that the nature of the country has exerted a certain influence on the contents of the lodes, and especially on the unequal amount of ore they contain; but the observations hitherto made can only be regarded as local, the results of which are not adapted to application, except in the localities where the observations were made. Local observations must be made concerning this influence before it can be rightly adopted as a foundation for mining operations.”

Enough has been said and quoted to prove, as clearly as such subjects admit of, that the conditions under which the silver occurs in the Silver Islet vein are not by any means abnormal, and that therefore mining operations may be safely based on past experiences, and that any other plan of exploration would be without either practical or theoretical justification.

There are several points of interest which may be given in a description of a Silver Islet vein, and a brief enumeration of a few is here added.

Although the vein is only under water the mine is not what would be called very “wet.” The water comes nearly wholly from below, streams of water in the upper levels ceasing suddenly when similar streams are cut at a lower point; the water may therefore be called legitimate mine water.

The fact has often been observed both north and south of the diorite dyke that a “throw” of the latter along the line of the vein has taken place, the diorite being found on one wall after the other has changed to slate. This “throw” was either contemporaneous with the formation of the vein fissure, or at least previous to the filling in of vein matter, as no evidence of such an extensive movement is to be seen in the vein itself; the only indication of motion afforded by “slickensides” would point rather to a vertical than horizontal movement.

In the body of the vein “floors” of varying lengths are met with and occupy a more or less horizontal position, but not in such regular form as to set down to motion of the lode.

These “floors” are merely lines of division or cleavage planes, showing no difference in the vein matter above and below, and are always of a rusty color, due doubtless to clay and the passage of water; clay, as already stated, being found in many of the “vuggs.”

Along these “floors” thin leaves and small masses of sulphides of silver almost invariably occur.

There are two very interesting forms in which silver has occasionally been found. The first form is that of thin plates of nearly solid metal. These plates were from 1-16 to 1-4 in. in thickness, and some were 8 and 10 in. square. When cut with a knife a solid surface is exhibited and yet the plates are brittle.

The cause of the brittleness becomes apparent under a glass, when it is seen that the plates are formed by the aggregation of numberless minute grains of silver, connected in a manner, but yet distinct, and so closely deposited that the cut of a knife left to the eye an apparently homogeneous surface of metal. An assay of a portion of one of these plates showed it to be 980 fine silver.

The second noticeable occurrence is the distribution of minute grains of metallic silver through a body of clear crystallized calespar, giving the later an opaque yellowish color which on a grindstone speedily shows a bright metallic surface. Such ore is termed “clay ore” by the miners, owing to its colour, and might be easily passed by as valueless by an inexperienced person.

Some of the common forms in which the silver is found are extremely interesting, the native silver, in company often with niccolite, forming most beautiful arborescent figures through the body of the vein matter.

In the neighbourhood of “vuggs,” masses of curiously twisted threads of native silver, superficially coated with black sulphide, were frequently brought to light. A few well-defined but imperfect crystals of native silver have been observed.

At the surface of the vein, and partly exposed under water, a rounded granite boulder was found firmly embedded in the vein matter; the nearest granite in place is nearly 20 miles north on the mainland.

As a somewhat similar occurrence to the plumbago in the diorite may be given the finding of isolated and frequently large masses of a soft greenish chloritic substance. The principal mass of this dipped to the south across the dyke, and wherever it encountered the vein had a bad influence on the latter, breaking it up, pinching it, or simply impoverishing.

Work is now being pushed downwards in the diorite dyke and the vein is found strong, perfectly defined and of good character, not only at the present bottom but at the lowest point yet reached by the diamond drill. When it is considered that only nine levels have yet been sunk and that six out of those nine yielded remarkably in silver, it will be understood that the owners have good ground for expecting another prize, and for continuing work on the plan already so successful. And, in this connection, it is worthy of note that, the mine being well equipped and having all means at hand for working, including a fine stamp mill, will yield on all future discoveries an even greater profit than the operations have heretofore.

The Smart-Turner Machine Company, Ltd., of Hamilton are receiving orders for their duplex pumps from all parts of Canada. Among recent orders is one for an electrically driven rotary feed pump and receiver for the heating system of the Technical School, Hamilton. Another order is from the corporation of Medicine Hat, Alta., for two double suction centrifugal pumps.



## THE NEW TRAIL TO GOWGANDA.

In our last issue we promised more detailed information concerning the new trail to Gowganda. For the benefit of those who intend to send parties into Northern Ontario the following facts have been collected.

A Canadian Northern express leaves the Union Station, Toronto, at 5.15 p.m. daily. The train includes sleepers and dining car. Travellers arrive at Sellwood at 7.45 o'clock on the following morning. At 8 a.m. the stages leave Sellwood. Burwash stopping-place is reached at mid-day. At Phoenix, 20 miles beyond Burwash, the night is spent. Here there is accommodation for 50 men. The sleeping-room is clean and comfortable. Separate beds are provided.

### Gowganda Transport Company.

Rates on boilers, heavy machinery and other heavy articles from Sellwood to Gowganda, not exceeding 5 feet in width or height:—

|                       | Total charge. | Number of teams supplied. | Number of men supplied. |
|-----------------------|---------------|---------------------------|-------------------------|
| 1 ton .....           | \$40 00       | 1                         | 1                       |
| Over 1 to 2 tons..... | 120 00        | 2                         | 2                       |
| Over 2 to 3 tons..... | 240 00        | 3                         | 3                       |
| Over 3 to 4 tons..... | 360 00        | 3                         | 3                       |



Photo by J. B. Tyrrell

BURWASH.

Shortly after noon on the second day Gowganda is reached.

A short cut through the territory of the Bartlett mines has lessened the drive from South Gowganda (Elkhorn) to Gowganda City by five or six miles.

The railway fare from Toronto to Sellwood is \$8.50, single. The sleeper costs \$2. From Sellwood to Gowganda City the stage fare is \$7, not including meals. Fifty cents per meal and fifty cents for a night's lodging are the established rates.

Mr. W. Phillips, the General Eastern Agent of the Canadian Northern Railway, Toronto, has kindly furnished us with the following provisional tariff issued by the Gowganda Transport Company:

If extra men are required to handle these articles from cars or to go along with the shipment to assist in handling, the extra charge per man will be \$2.50 per day. If owners have their own men available for this purpose, extra expenses will be avoided.

Should owners desire to handle these shipments themselves from Sellwood, the Gowganda Transport Company will provide teams at the rate of \$8 per team per day, which includes one man per team, as well as feed for horses.

Articles weighing over 4 tons are to be handled by owners only, the Gowganda Transport Company to provide teams under conditions outlined above.

These heavy shipments are to be handled over sleigh





Photo by J. B. Tyrrell

A PROSPECTOR'S TENT.



Photo by J. C. Murray

A GROUP TAKEN AT SOUTH GOWGANDA.

From left to right—Messrs. Cameron, Shaw, Errington and Cowan. Mr. Shaw is a well-known prospector; the others are officials of the Gowganda Transport Company.



Photo by J. B. Tyrrell

BURWASH STOPPING PLACE



Photo by J. B. Tyrrell

DISCOVERY POST ON A SNOW STAKED CLAIM.



Photo by J. B. Tyrrell

PHOENIX STOPPING PLACE.



road, so that no delay will occur in the movement of other sleighs containing freight or passengers.

It is important to note that although the snow may last until well on in April, yet it will be well for those who intend to ship in supplies to get them in at as early a date as possible. Ample storage facilities will be provided for merchandise, canoes, etc., at South Gowganda.

Meanwhile the road is to be kept in as good condi-

tion as possible; 150 teams are in commission. A road superintendent inspects the trail daily, and no pains will be spared to bring it up to its highest capacity.

The accompanying photographs will give a fair idea of the trail, etc. We would draw particular attention to the picture that shows a "valuable discovery." Ontario inspectors will have a busy time in the coming spring.

## THE REPORT OF THE GERMAN DEVELOPMENT COMPANY, LIMITED.

III.

1908.

### Abstract of Report on the Kananaskis Coal Area. By D. B. Dowling.

The matter in Mr. Dowling's description of the part of this area leased by the German Development Company is compiled from reports made by him to the Geological Survey of Canada, and papers read before the Canadian Mining Institute.

The prospecting of this area was not difficult owing to the fact that the exposures are mostly all on the hill-sides, in the gullies that run across the measures, the lower portion only being hard to expose owing to the greater accumulation of loose material from the higher slopes.

The few analyses so far made of outcrop samples show that these coals can be classed along with the Canmore coals, which are of great value as steam producers. Some of these seams may prove harder away from the outcrop or in the vicinity of the fault, but none of them should go higher than semi-anthracite in grade, except in local portions only of the seams. If a few seams do run to anthracite the market is not oversupplied and is steadily growing.

The major portion of this coal will serve for steaming (locomotive), and should be superior to anthracite for gas producer use.

Using the ratio between the volatile and fixed carbon constituents as a standard for comparison, the analyses of eight samples of the seams show that three of them are softer, or higher in volatile combustible matter, than any of the Canmore coals. Of the remainder all compare favorably with the upper or softer seams at Canmore. These Canmore coals have been in steady use on the C. P. R. locomotives in the mountains. This result is gratifying since the Canmore mines, capable of producing only 600 tons per day, was thought to be the only one in the district that could supply steam coal. If the measures near the Kananaskis be mined, the long haul from the mines on the Crow's Nest branch of the C. P. R. will be saved, and this area will become a large producer.

The number of seams discovered, as well as the undisturbed position of the measures, assure a very large total of mineable coal. Assuming that there is an average of 90 feet of coal to be mined where the whole thickness of measures is present, this amounts to 150,000 tons to the acre, or 90 millions per square mile. Allowing for dirty seams and coal left in the mine, an approximation of 65 million tons per square mile should not be excessive, or, for the total area of the company, about 500 million tons.

The Kananaskis Valley is wide where the measures cross it, and there is ample room and an excellent site for a town. The measures are cut to near the level of this valley by a small stream (Ribbon Creek), which comes from north of Mount Kidd, so that there are four points from which mining may start. The principal block of coal is north of the stream. The site there for mine works is ideal, as there is a natural terrace from which to drive tunnels, and from which loading facilities may be provided for the cars which would be below this level. This area being above the level of the river can be mined from the level entry, as in the plan pursued at Bankhead mine, affording natural drainage and very easy haulage for mine cars.

If the coal proves to be of the Canmore class the mining should be done as cheaply as at the above mine. The output will nearly all be marketed, as the fine coal is preferred by railway firemen. There will be a tendency by miners to include dirt with the run of mine, and careful picking and mining will have to be insisted upon.

In view of the fact that production of coal follows closely the increase in population, and in considering the future needs of the country, it is quite evident that if the present mines are working near full capacity, others must be opened in the near future.

The first need of the population is for domestic fuel. The next is for shipment of produce to market, and this means increased consumption of coal by the railways. Following the settlement is always the building of towns and the establishment of factories, mills, and other power users, so that not only the domestic fuel, but that for steaming and other power producing consumers, is rapidly called for.

Since the Kananaskis Valley coal grades from about bituminous to nearly anthracite, there should be a ready market for it, for both domestic and steam purposes.

1908.

### Abstract of Report on the Kananaskis Coal Lands. By James McEvoy, B.A.Sc. (Late Geologist and Chief Engineer to the Crow's Nest Pass Coal Co., Ltd.).

The Kananaskis coal lands, controlled by the German Development Co., Ltd., are situated on the Kananaskis River. The northern end of the property is 6 miles in a straight line due south of Gap Siding on the main-line of the C.P.R. The property is about 8 miles long, north and south, and its greatest width east and west is 2 miles. It comprises an area of  $7\frac{7}{8}$  square miles, or 5,040 acres.

A branch railway to reach the most suitable point of



access on the property would be 15 miles in length, and would connect with the C. P. R. at the Kananaskis bridge, a point distant 52 miles west of Calgary.

The Cretaceous rocks in which the Kananaskis coal occurs were deposited long before the Rocky Mountains were uplifted. When the uplift began the Cretaceous rocks were hardened and in a good state of preservation.

In that portion of the Kananaskis basin, in which the German Development Company's lands are situated, a great thickness of Cretaceous rocks was lifted up bodily.

The coal was evidently laid down in the form of peat bogs. Conditions generally may have been more favorable for the deposition of these bogs in Cretaceous times; in any case the bogs were of dimensions both in depth and extent, vastly greater than any bogs to be seen in Canada at the present time. Successive periods of inundation and covering up with mud and sand, with periods of quiet to allow the growths of other bogs, have laid down the series in the order that is now found.

The continued subsequent depression of the land brought about an enormous deposition of material

Estimating that only 75 per cent. of the coal can be actually taken out, we have:

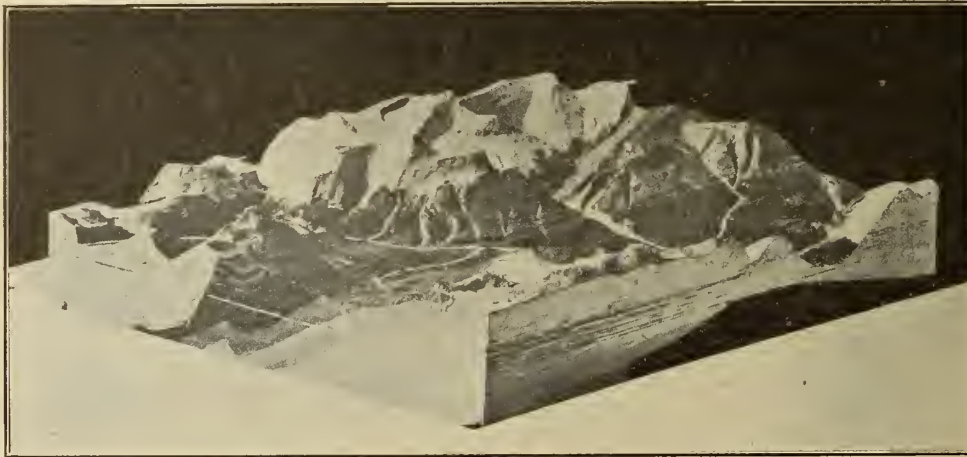
$$519,750,000 \times .75$$

=389,812,500 tons, which can be actually mined, or 4,000 tons a day for over 320 years.

About 125 million tons of this amount can be mined "to the rise," that is, it lies above the level of the point of access, and can be lowered to the main haulage road by gravity, and it will consequently be produced at less cost.

The coal is found at the bottom of the Kootanie series, which is the lowest division of the Cretaceous. Overlying is the Dakota Group, also Cretaceous, and underlying are the Fernie shales of Jurassic age.

The coal is semi-bituminous, that is, of higher grade than ordinary bituminous. The variation in qualities as seen by the relationship between the percentage of volatile matter and fixed carbon shows a considerable range. Those coals low in volatile matter, other things being equal, are the best for domestic use; while those higher in volatile will be preferred for locomotive use. The percentage of volatile matter even in the samples lowest in that respect is large enough to show that the coal will be free burning.



A RELIEF MODEL OF THE KANANASKIS COAL AREAS OF THE GERMAN DEVELOPMENT COMPANY.

forming the strata on top of the coal series, and the weight of these overlying measures began the work of altering the peat into a lignite. The completion of the alteration into the present high-grade coal is due to pressure and heat induced by the mountain-building forces exerted along the Rocky Mountain range. The Cretaceous rocks of the Kananaskis basin are a continuation of those which outcrop at Canmore on the C. P. R., where there is an operating coal mine.

In estimating the quantity of coal so as to keep within safe bounds, let it be assumed that of the 5,040 acres in the property only 4,500 acres will be underlain by all the seams. Taking 70 feet as the thickness of workable coal we have:

$$4,500 \times 70 \times 1,500 \text{ (tons per foot acre).}$$

$$=472,500,000 \text{ tons.}$$

This should be increased by 10 per cent., on account of the extra width of the seams, owing to the angle of dip, therefore,

$$472,500,000$$

$$47,250,000$$

$$519,750,000 \text{ tons.}$$

There are two possible points of access to the coal for operating purposes, one near the west bank of the Kananaskis, near the south end of the property, and the other on Ribbon Creek, near the centre.

All things considered, it is most advisable to open the mines on Ribbon Creek. About a mile and a quarter up the stream there is a flat piece of ground abundantly large for a colliery yard and plant. The coal seams outcrop in the hillside adjoining this flat, and the situation is such that the working part of the tippie can be placed close up to the mine mouth, thus avoiding a long expensive tippie approach.

In the larger seams it will not be practicable to use the longwall system, and some modification of the pillar and stall system must be used. Whether the rooms should be driven up the pitch, or across the pitch, will depend upon the cleavage in the coal. If there is no pronounced cleavage, or if the cleavage is not more than "half on" when driving across the pitch, then that method is preferable. Working in this manner across the pitch the mine should be laid out in panels with a back-balance incline at one side. The length of the rooms on had best be about 300 feet in any case, but the length to which the incline should be driven up



must to some extent be governed by the angle of pitch. Beyond that length, especially if the coal is mining freely, one balance could not properly take care of the output.

The ventilation fan should have an ultimate capacity of 200 to 300 thousand cubic feet of air per minute, and should be constructed entirely of iron or steel, so as to be absolutely fireproof. It may be driven either by steam, compressed air, or electricity.

The output for a year or more can be taken out by horse haulage. After that time some system for handling the coal will be necessary. Next to the endless rope the compressed air locomotive is the best, and if, as is very likely to be the case, the former should be impracticable, the latter system should be installed.

1908.

**Abstract of Report on Bighorn and Brazeau Coal Lands.** By James McEvoy, B.A. Sc. (Late Geologist and Chief Engineer to the Crow's Nest Pass Coal Co., Ltd.).

The Cretaceous coal measures outcrop on the west side of the Bighorn range close to its base and it is on these measures that the properties of the German Development Co., Ltd., are located, one on the Bighorn River, where it runs around the south end of the range, and the other on the south Brazeau River, where the stream cuts a deep gap through the north end of the range itself. The same series of rock formations is met with in the Bighorn and Brazeau countries as was found in the Kananaskis.

#### Bighorn.

There are seven seams of workable thickness, giving a total of 46 feet 2 inches of coal. Six of the seams, containing 38 feet of coal altogether, do not extend through the whole of the area, and in estimating the quantity of coal available it is considered that only 1,500 acres underlain by these seams can be worked from the point of access on the Bighorn River.

Therefore,  $1,500 \times 38 \times 1,500$  (tons per foot acre).

=85,500,000 tons.

One seam extends throughout the area, but it will be assumed that only  $3\frac{1}{2}$  square miles, or 2,240 acres of it can be conveniently worked.

Therefore,

$2,240 \times 8 \times 1,500$

=26,880,000 tons.

Total, 85,500,000

26,880,000

+10% for dip, 12,238,000

124,618,000 tons.

The character and attitude of these seams is such that very probably, as much as 85 per cent. of the coal can be actually taken out.

That is  $124,618,000 \times .85$

=105,925,300 tons that can be mined or

2,000 tons a day for over 175 years.

It must be borne in mind, however, that there is more coal available in adjoining territory which can only be mined through this property, and the Coal Lands Regulations are such that this adjoining land cannot be tied up by speculators, but will be available for lease when required. The amount of coal from this source will more than double the total above given. The measures will not be entirely free from disturbances, but taken as a whole the condition and altitude of the seams are favorable as far as can be judged by

surface showings and from the development work done.

The Bighorn coal is of high grade bituminous quality, closely resembling the best of the Crow's Nest coals from Fernie, B.C. It will probably yield a higher percentage of coke than any clean coal so far known in North America.

In all probability the dip of the seams throughout the main north-western portion of the Bighorn field will be steep enough to allow the back-balance system of mining. In the southern part of the field, where the dips become less, compressed air hoists may be employed until the dips are less than  $10^\circ$ , after which by driving "slants" the coal can be gathered by horse haulage.

The cost of opening up the Bighorn mines to a daily capacity of 2,000 tons will be practically the same as for the Kananaskis, that is, for an up-to-date plant with the best type of machinery, it will be about \$1,500,000.

If one-third of the output is to be coked the cost of the ovens completely installed will be from \$300,000 to \$500,000, making a total cost of from \$1,800,000 to \$2,000,000.

#### Brazeau.

To the south of the property the coal-bearing rocks are badly disturbed, and this disturbance extends into the property itself for over a mile, decreasing in intensity.

More than twenty coal seams in all were uncovered during the season. Most of them on the banks of George River. The gross total of coal in this section is 86 feet, and of this amount 60 feet in 8 seams is workable.

Making allowance for the loss of the disturbed area and for the lands extending beyond the outcrop of the coal, there is approximately an area of 2,000 acres of productive coal lands. Taking 60 feet as the workable thickness we have—

$2,000 \times 60 \times 1,500$  (tons per foot acre).

=180,000,000 tons

+10% for dip of seams

=198,000,000 tons.

Taking 85 per cent. as the proportion that can actually be extracted, we have  $198,000,000 \times .85$

=168,300,000 tons or 4,000 tons a day for over

140 years.

The Brazeau coals, like those of the Bighorn, are of high grade bituminous quality, and show equally good coking properties. The ash in nearly all cases is terracotta colored, or, as popularly termed, they are red ash coals. Samples were tested at Fernie, B.C., and give in each case a bright and exceptionally strong coke.

The Canadian Northern Railway is to be extended into the Brazeau field and the Grand Trunk Pacific now under construction will pass within 65 miles of the property.

The grade of the valley of the South Brazeau, where it crosses the property, is about 1 to  $1\frac{1}{4}$  per cent., which is well suited for a colliery yard, and there is an easy approach for a railway.

The building of the Canadian Northern into the Brazeau field will open up at once a great market for this coal.

Beside the markets for coke in Canada and the United States, the Brazeau and Bighorn will be in the best position to fill the demand for coke in the Telkwa Valley when the large bodies of lead and copper ores there are smelted.

By far the greater part of the coal must be taken from the slope workings. The angle of dip is well suited to the back-balance system of mining.

# MINE ACCOUNTING.

By John G. Grant. B.A.\*

(Continued from last issue.)

## II.

All the goods bought by a mining company to carry on its operations from day to day are called "stores." Timber, explosives, coal, ropes, tools, etc., are examples of what is covered by this general name. In preparing the revenue account for the year at the head office, the total cost of stores consumed during the year and the stock on hand at the end of the year must be known. In order to supply this information, records must be kept at the mine of all stores received there and all stores distributed. Also, a book or books must be kept showing what the estimated stock on hand is at any time for any class of goods. This latter is necessary from the fact that the orders and payments for stores, are issued, not from the mine, but from the head office, and to keep a supply on hand sufficient to meet any requirement, a knowledge of the quantity on hand, at all times, of any article, is necessary.

To record the receipt of stores either a loose-leaf or

"Stock Received" book may be used. In the case of the loose-leaf book it must be so arranged that two copies of each entry will be made, the original to be placed in the loose-leaf binder and the duplicate, (carbon copy) sent to the head office. Where the bound "Stock Received" book is used, the book itself or a certified copy of it must be sent every month to the head office. The reason for notifying the head office regularly of the receipts of stores is that all invoices are paid from there, and these invoices must be checked for prices and amounts before payment can be made.

Since the average storekeeper at a mine has no extensive knowledge of accounts, and since his duties are varied to such an extent that his bookkeeping is done "when he has time," I have deleted from the common forms of ruling the under-mentioned books all subdivisions not absolutely necessary. The form of the "Stores Received" book shown below is, I think, quite comprehensive enough for practical purposes:—

Stores Received Book

| Date | Name | A/c Charged | Filed in Ledger | Quantity |        | Description |
|------|------|-------------|-----------------|----------|--------|-------------|
|      |      |             |                 | No       | Weight |             |
|      |      |             |                 |          |        |             |
|      |      |             |                 |          |        |             |
|      |      |             |                 |          |        |             |
|      |      |             |                 |          |        |             |
|      |      |             |                 |          |        |             |
|      |      |             |                 |          |        |             |
|      |      |             |                 |          |        |             |
|      |      |             |                 |          |        |             |
|      |      |             |                 |          |        |             |

It will be noticed that the storekeeper is not concerned in any way with the cost of the goods received. His business is to keep an account of the quantities and weights and to keep separate the different classes of goods received. The latter requisite is satisfied by the entry in the "Accounts Charged" column. In this column is entered the name of the articles received, such as wire rope and hemp rope, hammers, shovels, etc., and a separate account opened for each in the "Stores Ledger" mentioned below.

The distribution of stores provides an opening for

dishonesty and waste, particularly the latter. If the goods were handed out at the request of any workman, no adequate check can be made as to what quantity should be on hand, and as to the rates of consumption of any class of goods. No stores should be delivered by the storekeeper except on a requisition signed by the mine manager or some responsible foreman. These orders should be made and signed in duplicate by means of a carbon sheet, one to be handed to the storekeeper, the other to be kept by the manager. The requisition form may be prepared after the following form:—

| Requisition for Materials |        |             |                  | No.  |
|---------------------------|--------|-------------|------------------|------|
| Quantity                  |        | Description | Where To be used | Date |
| No                        | Weight |             |                  |      |
|                           |        |             |                  |      |
|                           |        |             |                  |      |
|                           |        |             |                  |      |
|                           |        |             |                  |      |
|                           |        |             |                  |      |
|                           |        |             |                  |      |
|                           |        |             |                  |      |
|                           |        |             |                  |      |

Signature .....

It is imperative to demand requisitions for all stores distributed. Workmen will be much more careful in the use of explosives, etc., when they have to ask the foreman to sign an order for each new supply. Also,

contracts made for sinking shafts, etc., on the basis of the company supplying the stores leave an opening for

\*Chartered Accountant, Toronto, Ont.



a wasteful use of stores which can only be curtailed by the storekeeper insisting on a requisition signed by the company manager. Contracts like the latter are seldom made, and this very fact would aid the contractor in rushing his work at the expense of stores he does not

have to furnish, without being detected and called to account.

These requisitions are entered in a "Stores Delivery" book, of which the following is a simple and sufficient form of ruling. This is, like the "Stores Received" book, a bound volume.

| Stores Delivered Book |            |              |       |          |        |             |
|-----------------------|------------|--------------|-------|----------|--------|-------------|
| Date                  | Where Used | A/c Credited | Folio | Quantity |        | Description |
|                       |            |              |       | No.      | Weight |             |
|                       |            |              |       |          |        |             |
|                       |            |              |       |          |        |             |
|                       |            |              |       |          |        |             |
|                       |            |              |       |          |        |             |
|                       |            |              |       |          |        |             |
|                       |            |              |       |          |        |             |
|                       |            |              |       |          |        |             |
|                       |            |              |       |          |        |             |
|                       |            |              |       |          |        |             |

The column, "Where Used," is most important, as each shaft, cross-cut, main level, drain, etc., should be charged with the materials from the storehouse used in making them when making up costs at the end of the year. The column "Accounts Credited" is just the same as the "Accounts Charged" column in the "Stores Received" book.

A book called the "Stores Ledger" is kept, to which both of the above books are posted, the folio column in each book having numbers referring to the page in the Ledger on which is kept the particular account mentioned in the "Accounts Charged" and "Accounts Credited" columns. The receipts are posted to the debit of the accounts, and the deliveries to the credit of the accounts. The difference between the two must

be the stock on hand at any time. Of course, the difference is of no value unless the books are kept posted up all the time, as they should be. If posting is neglected, requisitions will be sent in to the storekeeper for goods which are not on hand. When goods are ordered through the head office and several days must necessarily elapse between the giving of the order to the head office and the receipt of goods. Close watch must therefore be kept and requisitions sent to the head office for goods, the stock of which is running low, in ample time for the goods to be received before the balance is exhausted. This may mean the saving of several days' time on contract work, etc., and the result is obtained by the storekeeper simply keeping his accounts posted up to date. The requisitions sent to the head office should be as follows:—

| Storekeeper's Requisition |                        |                               |                     |               |         | No.<br>Date |
|---------------------------|------------------------|-------------------------------|---------------------|---------------|---------|-------------|
| Article                   | Date of<br>Last Supply | Quantity<br>of<br>Last Supply | From Whom Purchased | Present Stock | Remarks |             |
|                           |                        |                               |                     |               |         |             |
|                           |                        |                               |                     |               |         |             |
|                           |                        |                               |                     |               |         |             |
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|                           |                        |                               |                     |               |         |             |
|                           |                        |                               |                     |               |         |             |
|                           |                        |                               |                     |               |         |             |

At the close of the year the inventory of stores on hand is taken, and the Stores Ledger balances afford a most valuable check on the accuracy of the stocktaking. An explanation should be given for any discrepancies shown by the check, and there will always be a

few differences, no matter how carefully the work during the year has been done.

In the next article I will take up the questions of wages books, analysis of costs, and the forms to be sent to the head office.

(To be continued.)

### MINE WATERS.

By A. C. Lane, State Geologist of Michigan.

Abstract by R. E. Hore, Dept. Geology, Kingston, Ont.

At the June, 1908, meeting of the Lake Superior Mining Institute, Dr. Lane read a paper which contains an abundance of data regarding the waters of the copper and iron mines of the Lake Superior district.

A large number of chemical analyses are given and it is shown that both in iron country and copper coun-

try the surface waters are comparatively soft. With increasing depth the amount of chlorine increases. The calcium percentage increases also, so that we may say that calcium chloride is present. These waters seem to have been buried with the strata, and may be called connate waters. At depths greater than fifteen hundred feet their strength is not uncommonly greater than that of sea water.

Of the numerous analyses discussed in the paper two are here given as typical of the lower and upper levels:

No. 96 Quincy Mine, dripping on 55th level, north of No. 6 shaft. Analysis by Dr. Fernekes.

|                                                                         |         |                  |   |   |   |
|-------------------------------------------------------------------------|---------|------------------|---|---|---|
| Cl. ....                                                                | 176.027 | grams per litre. |   |   |   |
| Br. ....                                                                | 2.200   | "                | " | " | " |
| Ca. ....                                                                | 86.478  | "                | " | " | " |
| Na. ....                                                                | 15.188  | "                | " | " | " |
| K. ....                                                                 | .411    | "                | " | " | " |
| SO <sub>4</sub> .....                                                   | .110    | "                | " | " | " |
| SiO <sub>2</sub> .....                                                  | .020    | "                | " | " | " |
| Fe <sub>2</sub> O <sub>3</sub> and Al <sub>2</sub> O <sub>3</sub> ..... | .010    | "                | " | " | " |
| Mn. ....                                                                | .004    | "                | " | " | " |
| Cu. ....                                                                | .016    | "                | " | " | " |
| CO <sub>2</sub> .....                                                   | none    | "                | " | " | " |
| Ni. ....                                                                | .006    | "                | " | " | " |
| Sr. ....                                                                | trace   | "                | " | " | " |
| Ba. ....                                                                | none    | "                | " | " | " |
| Li. ....                                                                | none    | "                | " | " | " |
| Mg. ....                                                                | .020    | "                | " | " | " |
| Boron. ....                                                             | trace   | "                | " | " | " |
| Sum .....                                                               | 280.489 | "                | " | " | " |
| Difference .....                                                        | .011    | "                | " | " | " |

Total solids determined 280.500 " " "

No. 110, South Kearsage, No. 1 shaft, dripping at 9th level. Analysis by Dr. Fernekes.

|                                      |        |                  |   |   |   |
|--------------------------------------|--------|------------------|---|---|---|
| Cl. ....                             | .702   | grams per litre. |   |   |   |
| Ca. ....                             | .0912  | "                | " | " | " |
| Na. ....                             | .414   | "                | " | " | " |
| SO <sub>4</sub> .....                | .075   | "                | " | " | " |
| SiO <sub>2</sub> .....               | .035   | "                | " | " | " |
| Fe <sub>2</sub> O <sub>3</sub> ..... | .030   | "                | " | " | " |
| Sum .....                            | 1.3472 | "                | " | " | " |
| Difference .....                     | .0028  | "                | " | " | " |

Total solids determined 1.350 " " "

Two facts stand out very prominently. The much greater percentage of chlorides in deep waters and the reversing of the quantitative relations of calcium to sodium.

In No. 96 it is worth noting that calcium and sodium chlorides form 99 per cent. of the total salts, and sodium bromide three-fourths of the remainder.

The determination of the character of the mine waters has aided materially the study of the origin of the ore deposits.

It seems safe to assume that some of the Keweenaw

wan conglomerates and amygdaloids were filled with sea water and contained some chlorides. Warmed by heat given off from slow cooling lava sheets, these waters attacked the lavas and produced the chlorite and zeolites so characteristic of the melaphyres. Hence much of the water was absorbed, in formation of hydrous minerals, and what remained was relatively stronger in chlorides.

On further cooling water was drawn in from the outcrop and a second set of alterations took place with deposition of minerals at the contact of the soft and hard waters. Copper deposited especially with calcite prehnite and epidote.

The formation of copper from chloride solutions has been accomplished in the laboratory by Dr. Fernekes. The end products are actually the common products of the veins and the most abundant constituent of mine waters—calcium chloride.

In the secondary changes of the mine waters and in all the reactions leading to the deposition of copper there was accumulation of sodium in the mine waters. After the copper was formed sodium accumulated to such an extent that sodium minerals were precipitated.

R. E. HORE.

### SUCCESSFUL USE OF THE "BRAT" OXYGEN REVIVING APPARATUS.

(Excerpt from "Gluckauf" of January 30th, 1909).

The "Grossherzog von Sachsen" Colliery, Dietlas, Germany, report that a successful demonstration of the usefulness of the "Brat" reviving apparatus recently occurred at this time. On the 27th November a number of the workmen were more or less asphyxiated by a sudden outburst of carbon-dioxide gas. Some who had already been given up for dead by the doctors were brought back to consciousness and their lives saved by the use of this device.

The "Brat" apparatus is made by the Westfalia Company, and differs from the first forms of simple oxygen administration in that not only is pure oxygen under pressure forced into the lungs of the unconscious person, but by the use of an injector the compressed oxygen stream is used to exhaust the lungs of all poisonous and deadly gases which have been breathed in. Briefly, this apparatus will strongly deflate and inflate the lungs of an unconscious person, and simulate natural breathing.—Communicated to "Gluckauf" by Bergassessor Grahn.

## BOOK REVIEWS.

**Metal Statistics, 1909.** Published by the American Metal Market and Daily Iron and Steel Report, 81 Fulton Street, New York.

From statistics issued by prominent authorities, particularly from the reports of Messrs. Henry R. Merton & Co., Limited, Aaron Hirsch & Sohn, and other like sources, this handy little pamphlet has been compiled. To the buyer or seller of metals it should be invaluable.

The metal section includes figures dealing with the production, consumption, and price movements of metals. Iron and steel, copper, tin, spelter, lead, silver, antimony, metal duties, and price equivalents are the headings.

**Economic Geology of the United States.** By Heinrich Ries, A.M., Ph.D., Professor of Economic Geology at Cornell University. Second Edition. 451 pages. Illustrated with half-tones, maps and diagrams. Price, \$2.60 net. Published by the Macmillan Company of Canada, Limited. Toronto, Ont., 1907.

In the second edition of Dr. Ries' book the statistics have been brought more nearly up-to-date, and all observable errors have been corrected. Also a second appendix has been added, containing a list of the more important papers published since the appearance of the first edition.

The ground covered corresponds with that gone over in the elementary course in economic geology in



Cornell University. Non-metallic minerals are given precedence over metallic minerals. Modes of occurrence geographical distribution and uses of minerals are given due prominence.

Dr. Ries confines his attention exclusively to the United States. Doubtless the inclusion of information bearing upon other countries would have made a much larger volume necessary. Yet it is probable that had the author added a chapter or two on Canadian and European minerals and mineral markets he would have enhanced the value of his work.

"Economic Geology of the United States" has filled a specific demand across the border. It should be read by Canadian educationists. The need of some such publication on Canadian economic geology was never more apparent.

**Gold: Its Geological Occurrence and Geographical Distribution.** By J. Malcolm Maclaren, D.Sc. One colored plate and 278 illustrations; 687 pages. Published by The Mining Journal, London, England. 1908. Price, 25 shillings net.

The systematic study of ore deposits has become one of the chief activities of modern geologists. In many cases the owners of large mines employ economic geologists to control exploratory work. Thus the economic phases and applications of geology are occupying more and more attention. This is as it should be.

Dr. Maclaren has written this volume on "Gold" with the object of arranging scientifically data already published, and of presenting facts not before known by his readers. He tells us in his preface that "it is believed that absolute progress in the science of ore-deposits will, in the future, be made largely, if not entirely, by induction reasoning." He sets out, therefore, to arrange, in readily accessible form, the salient facts of the deposition of gold.

The book falls naturally into two parts. Part I., which occupies 117 pages, defines the general relations of gold deposits. First the broad principles of cosmology are considered. Then fissures, underground waters, fissure filling, secondary enrichment, are touched upon. After further treating the physical and chemical qualities of gold and of compounds of gold, a classification of gold deposits is given. This closes Part I.

Part II. consists of a descriptive outline of the gold deposits of the world, arranged by continents. Wherever the importance of a district warrants it, geological data, mining conditions, costs, etc., are given. The book is profusely illustrated.

There can be little question as to the need of boiling down the stupendous mass of geological and mining literature that has been produced, and is being produced. Much that is worth preserving would be lost to the reading public were it not for the energy and enthusiasm of men like Dr. Maclaren. Compilation of scientific data is a task for which few men are fitted. It is irksome work. The conscientious compiler is not unlike the mountain that labored and brought forth a mouse. He must read countless periodicals and look up numberless references. He must condense and select and reject from masses of figures and facts. Then he must mould the residue into a coherent and balanced whole.

Dr. Maclaren, unlike most English writers on technical subjects, gives evidence of having followed closely the best literature of his own and other countries.

His bibliographical references are exceedingly complete and creditably up-to-date. To say the least, this is not generally the case with our trans-Atlantic brethren. Too often their citations from other authors date back ten, twenty, or thirty years, and do not include recent writers at all.

In Part I. the author's treatment of the origin of auriferous deposits is clear. His diction is dignified, his style forceful, and his reasoning convincing. That he has acquired a thorough knowledge of the science of ore deposition is apparent from the appositeness of his allusions, and the skill with which, in very limited space, he sketches the present status of the science.

We have stated that Dr. Maclaren's style is commendable. In one respect, however, it is open to criticism. This is his frequent use of the split infinitive. It may be argued that this is an infirmity of many great and good writers. Nevertheless, it is a fault as ungraceful as it is unnecessary.

We believe that Dr. Maclaren's book will speedily be recognized as a sound, capable and comprehensive treatise on a subject that will never lose interest.

**Mining Methods in Europe.** By Lucius W. Mayer. Mining Engineer, 169 pages, illustrated with drawings and photographs. Hill Publishing Company, 505 Pearl Street, New York. Price, \$2.50 net.

The general scarcity of literature on the subject of underground attack incited Mr. Mayer to write this volume. Mr. Mayer, after extended journeys of observation through Great Britain and parts of Europe, has described, from an American point of view, some of the more interesting and important mining methods of Europe.

Ninety-four pages are assigned to descriptions of mining methods in England and Wales. The remainder of the book touches on various phases of mining in Germany, France, and other countries.

Whilst nearly every chapter contains useful data, Chapter VI., "Longwall Methods of Mining Flat Seams," is particularly suggestive. We concur heartily with the author that the advantages of this system are not appreciated on this continent. Canada is probably ahead of the United States in coal-mining practice, but both countries have much to learn from Great Britain and Europe.

"Mining Methods in Europe" is not a compendium of European mining practice. But it contains many descriptions that should prove helpful, especially in Canada. The book is exceedingly practical and, because of the variety of subjects treated, it is easily readable. It is essentially a mining engineer's book.

We cannot forbear noticing that Mr. Mayer is needlessly inexact and inaccurate in his use of words. On page 24 and 25, occurs the sentence, "The possibilities . . . is not beyond reason." This may be merely a typographical error. But on page 29 we find the word "infers" misused. In describing "Retreating Longwall," Mr. Mayer writes thus: "In general, retreating longwall infers," etc., etc. "Implies" and not "infers" is obviously what is meant. On page 30, also, there is an inexcusable blunder. Only from the context is it possible to guess what Mr. Mayer is driving at when he states that "Not alone does the action of the air ameliorate the quality of the coal . . ."

Whilst these symptoms of literary sloppiness cannot be overlooked, we do not hesitate to commend Mr. Mayer's book as highly practical, interesting, and, in matters of technical detail, carefully wrought.



## PERSONAL AND GENERAL.

Mr. H. L. Brown, E.M., has been appointed manager of the Silver Cross Mine at Cobalt. Mr. Brown has had experience in the United States and Mexico, and is said to be one of the best in the profession.

The Secretary of the Canadian Mining Institute has forwarded us the following communication. It appears only at the urgent solicitation of a number of literary Canadians. Hereafter we shall charge advertising rates for all flowing numbers:—

Dear Mr. Lamb,—I have spent several most delightful hours since yesterday reading your notes on the trip. They bring back so many pleasant memories, and some of them so vividly that they seem to have produced a temporary "brain-storm," during which I have semi-consciously jotted down some supplementary notes, as per attached slip:—

'Twas on the plains of Calgary,  
Out westward quite a way,  
Some engineers both brave and proud  
Had stopped to spend the day.

A cattle king, Pat Burns by name,  
Had hailed them as his guests.  
"My friends," said he, "of cowboy fun  
I think we'll go in quests."

"Yes, yes," they cried in unison,  
"This is the woolly West.  
Bring forth your cowboys, bronchos, steers,  
We'll have naught but the best."

"'Tis well," cried Pat, and in his eye  
There danced a little gleam.  
"Go on there, men, just let 'em out;  
We'll show what's to be seen."

But hark, there comes a muffled roar:—  
"The steer!" A cloud of dust,  
And each brave feels his only chance  
Is climb, or run, or bust!

One sprints behind a friendly pole,  
'Twas a record-breaking dash.  
Could he repeat it? I think not,  
Though great the prize in cash.

Another climbed the stoutest post,  
And grinned in fiendish glee.  
Said he, "While I am up thus high,  
The steer, he can't get me."

A third one, gentle as a Lamb,  
Was—well, we don't know where.  
But anyhow he took some notes  
Which were preserved with care.

And these, prepared in faultless style  
Under his watchful eye,  
Will not permit us to forget  
The trip of the C. M. I.

Yours sincerely,

II. RIES.

Judges of literary merit will have no difficulty in conceding that Dr. Ries' great epic entitles him immediately to take rank with such distinguished poets of this class as Homer, Dante, and Mr. J. C. Murray. He

has unquestionably a brilliant career before him. His style is dramatic, yet smooth and even. His disregard for the conventional laws of metre evidences genius. The only fault we have to find—and this no doubt may be attributed to youth and inexperience—is that the climax is tame and unworthy of what comes before; and, while admitting that to take liberties with the original production of genius is a proceeding not as a rule to be countenanced, we have considered the circumstances sufficiently important to suggest to the author the addition of the following lines:—

But the true hero of this tale,  
With modesty most rare,  
Omits to note in the above  
What he was doing there.

How single-handed, quite alone,  
He circumvented that steer,  
And rescued from a tragic fate  
A gallant engineer.

And thus the Ries-on "why we're here"  
Remains for me to tell.  
We're here because we took along  
A brave man from Cornell.

H. M. L.

## CORRESPONDENCE.

To the Editor Canadian Mining Journal.

Dear Sir,—The Hon. Mr. Drummond's letter, which appeared in the Montreal Star, and also in the issue of the Maritime Mining Record of January 13th, on the development of Wabana Mines, by the Nova Scotia Steel and Coal Company, is certainly interesting from more points than one.

It seems to me that a little further explanation is necessary before the public, like a boa-constrictor, can swallow a goat, horns and all.

First, Mr. Drummond says, "The extent of the Scotia's areas is some 38 miles." The mine map (dated early in 1907), from the Newfoundland Government, shows the company's submarine holdings to be 19 areas, of one-half square mile each. These, together with the whole total area of Bell Island, would not make the extent of area as given in Mr. Drummond's letter.

We are pleased and proud of Mr. Chambers' record-breaking feat in driving the slopes, but I fail to see how one pair of slopes, driven on one vein just to tap the area of 9½ square miles, can prove the extent of the three veins supposed to be contained therein; particularly when one of these veins over-lies the one on which the slopes were driven. If this is true of Wabana, why will it not apply to Nova Scotia? I will venture to say that Mr. Drummond has knowledge of more than one pit, trench, or shaft in Nova Scotia, that has tapped more than eleven feet of ore, with greater length of vein than is shown by the pair of slopes driven at Wabana.

Again, Mr. Drummond says, the driving of these slopes had an element of risk. "Who knew how soon a fault or clear cut-off might be encountered?" Has this element of risk been totally removed? The length of these slopes to tap the submarine areas is 5,160 feet. To get through to the outer boundary the distance is something over 6,000 feet. The extension east and west, as given by the Mines map, is three miles, yet we would infer from Mr. Drummond that the element of risk has all been removed. I would like to ask in Mr.



Drummond's own words, in the further development of these areas, "Who knows how soon a fault or clear cut-off may be encountered?" Also, who knows how much and what kind of a roof is over the upper vein, or if there is sufficient to allow it to be worked with safety?

Another point in Mr. Drummond's letter which is hard to understand, that is, how he makes his calculations to get 2,500,000,000 tons of ore.

He says, "The sinking of the slopes has proven beyond peradventure that there is ore of excellent quality in twenty square miles of the company's areas, with the probability, amounting to almost a certainty, that the three seams underlie all of the remaining eighteen miles of the territory."

Let us assume that the total area, twenty square miles, as containing three seams having an aggregate thickness of twenty-five feet. Twenty square miles equals 557,568,000 square feet, or multiplied by the thickness of the ore, equals 13,939,200,000 cubic feet. The specific gravity of Bell Island ore is 4.14, or 258.75 pounds per cubic foot. We, therefore have:

$$\frac{13,939,200,000 \times 258.75}{2,000} = 1,803,384,000$$

tons as the possible total that could be contained in this area.

As it is impossible for the company to have this area at Wabana, let us get down nearer the facts.

In 1899 the Nova Scotia Company sold to the Dominion Steel all their holdings at Wabana, excepting the upper (now middle) vein. They afterwards secured 19 submarine areas, of one-half mile each, being beyond those sold to the Dominion Steel and the Dominion Steel secured five more areas again beyond and adjoining those taken by the Nova Scotia Company.

In 1900 the Nova Scotia Company equipped and began operating the middle or upper vein, and have carried on extensive operations ever since. This vein has a total length on outcrop of a little over 7,000 feet, and a width considerably less than one-half mile.

For easy computation, although excessive, let us say the company has a total area at Wabana of ten square miles. It will be readily seen, that instead of having 1,803,384,000 tons as above, we only have 901,692,000 tons, as the quantity of ore at twenty-five feet in thickness that would be possible for this area to contain.

But this quantity cannot be considered available. I think Mr. Drummond will agree with me that if the company can win seventy-five per cent. of this they will be doing remarkably well. We, therefore, have as an available ore supply 676,296,000 tons less the amount already taken from the land area, and less the difference between the estimated twenty-five feet over the whole areas and the known average thickness (8 feet) of the one vein which the company own on the land area. Of course, this is all, providing there are no faults, clear cut-offs, etc., etc., in the submarine areas, and that there is sufficient roof over the upper vein to work them with safety.

Yours respectfully,  
W. F. JENNISON.

Truro, N.S., Feb. 12th, 1909.

#### MINERAL VEINS IN THE MONTREAL DISTRICT.

It would probably be difficult to find more striking examples of the value of criticism and discussion than the two papers by Dr. Barlow and Mr. Hore that appeared in recent issues of the Canadian Mining Jour-

nal on the above subject, as the result of my letter in your issue of December 15th. These two papers are important contributions to the literature of our cobalt-silver ore deposits, and should be read by everyone who is interested in the character of these deposits.

The letters undoubtedly clear up several points which were somewhat obscure in the original papers, and Mr. Hore's excellent classification of the mineral veins adds greatly to the clearness of the subject, and forms a basis for further discussion.

It is evident that Mr. Hore and I are essentially in accord as to the character and origin of the mineral veins, except in the matter of names; but, as the clear and distinct use of names is necessary for the proper representation of ideas, it may be well to say a few words farther on this point.

With regard to the present usage of the words like "dike" and "vein," Professor J. F. Kemp, in his "Handbook of Rocks," third edition, 1906, page 182, gives the following definition of dikes: "Intrusions of igneous rock in fissures, not to be confounded with 'veins,' which are precipitated from solution." On page 15, he again says of dikes: "They, therefore, constitute elongated and relatively narrow bodies of all sizes, from a fraction of an inch in thickness and a few feet in length, to others a thousand or more feet across, and a mile in length." Chamberlin and Salisbury, *Geology*, Volume I., page 564, express themselves thus: "Fluid rock forced into fissures and solidified there, forms dikes." Norton, *Elements of Geology*, page 261, has this: "The sheet of once molten rock with which probably a fissure has been filled, is known as a dike."

It is true that some of the older geologists use the terms "dike" and "vein" rather loosely and interchangeably; but with modern geologists the general usages are those given by Prof. Kemp in the quotation cited above. And both Dr. Barlow and Mr. Hore agree with me in considering that the aplite or pegmatite filling the fissures in the Montreal River District has flowed into these fissures as a molten igneous rock, and, therefore, by the definition given above it has formed "dikes." They also probably agree with me in considering that the calcite veins were deposited from aqueous solutions, and are true veins.

It is, therefore, advisable to conform to the general usage of geologists and authoritative writers on ore deposits and call these narrow aplite bodies dikes and not veins.

In regard to the probability of silver being formed by magmatic segregation from the aplite, Mr. Hore says in effect that the meanings which we apply to the phrase are different, and he explains that he meant a magmatic concentration of the silver, etc., in the residual fluid portion of the diabase before it solidified completely, rather than the "fractional crystallization," which took place in the formation of the Sudbury nickel deposits. The theory of the magmatic segregation of ore deposits was elaborated very fully by Dr. Barlow himself in his study of the Sudbury nickel ores, and in a discussion of his and Mr. Hore's papers, it was only reasonable that I should take the Sudbury deposits as types of the process. But it is not necessary to take my unconfirmed statement with regard to the meaning of this phrase. Dr. Barlow himself defines magmatic differentiation as follows: "The division or differentiation of a more or less viscous magma or fused mass of rock, into chemically and mineralogically diverse parts, which on cobbing yield correspondingly different types of rock."

(Nickel and Copper Deposits of the Sudbury Min-



ing District. By A. E. Barlow, Ann. Rep., G. S. C., Volume 14, Part H., page 125, 1904.)

Dr. R. Beck, in the "Nature of Ore Deposits," 1905, page 11, writes of magmatic segregation as follows: "In some cases of concentration of the ores, either into stock-like masses or into bands has taken place in the rock either before or during its solidification from the molten condition; then magmatic segregation or secretion being of primary origin, will be considered first in this work," and "Although concentrated in compact masses, the ore of these magmatic deposits is exactly the same as that which occurs in sparsely-scattered particles through the enclosing rock, in which the ore minerals are necessary constituents."

"This particular fact is the most important argument for the truly primary nature of such deposits, and enables one to discriminate between magmatic segregation and those accumulations of ore that have been formed through secondary processes in an eruptive mass."

Thus it will be seen that the ore must have been a primary constituent of the molten rock, and must have been separated out where it is at present found. If it has been precipitated from aqueous solution after the rock had solidified, the phrase "magmatic segregation" as defined by Barlow and Beck, does not apply. Now if it can be shown that the silver is a primary constituent of the aplite, such evidence would be an exceedingly interesting addition to our knowledge of silver deposits. But Dr. Barlow does not seem to me to prove this, and Mr. Hore, in his original paper, states that: "The ores were deposited from solutions which followed the aplite intrusions"; and in his last letter "it is implied that silver was in solution after most of the magma had solidified."

Dr. Barlow does not use the term "magmatic segregation," but he makes the definite statement that "not only the native silver, but also the characteristic sulphides and arsenides began to be introduced with the first pegmatite (aplite) filling. These metallics did not wait for the reopening of the pegmatite, and the introduction of more abundant aplite." "The pegmatites . . . are themselves the ore bringers." These statements seem to me clearly to imply the presence of primary metallics in the pegmatites, and consequently the existence of a type of silver-bearing deposit unknown, and until very strong proof can be shown of the existence of such conditions it seems more rational to accept the present explanation of the formation of such veins; namely, that they are formed by deposition of the minerals from aqueous solutions subsequent to the formation of the pegmatite (aplite) dikes.

I accept with pleasure Dr. Barlow's statement that there was no uncertainty in his mind as to the laccolitic character of the diabase; but it was quite impossible, without explanation, for me to undersand his use of the word "profound," for it does not appear in any dictionary accessible to me as a synonym of "widespread." The Imperial Dictionary gives its meaning as "deep . . . descending far below the surface . . . having great depth." No indication of any meaning which would indicate horizontal extension is given, neither would the original derivation of the word indicate such meaning.

J. B. TYRRELL,

Feb. 19th, 1909.

9 Toronto St., Toronto.

Editor Canadian Mining Journal:

Dear Sir,—In your issue of February 15th I have read with some interest a letter from Mr. E. Percy Browne, criticizing Prof. Haultain's article on "The Mill Test for Gold versus the Assay."

In the course of this, Mr. Browne says that he has been following for three or four years mine sample assay values in a large gold mine, comparing them with actual results. He says that "though these samples were taken as carefully as possible, always taking large samples, usually in duplicate, the results did not accurately represent the value of the ore." Farther on he quotes a paper by Prof. Richards and Mr. Bugbee, showing "the impossibility of valuing a free milling gold ore by sampling and assaying." This quotation is in italics, which I take to be Mr. Browne's, and from this I infer that the words quoted accurately represent his opinion.

There are one or two points which, to my mind, require elucidation. Are the samples in the mine referred to by Mr. Browne taken systematically at close intervals in all shafts, drives, raises and winzes on the vein? If they are not, then I cordially agree with Mr. Browne, that they are of little value, however large they may be.

If they are taken systematically, then what is the nature of the deposit worked? Is it a quartz vein, and, if so, how wide is it? If it is so wide that one ordinary-sized drift will not expose both hanging and foot walls, then samples, even though taken at regular intervals, will not cover the whole width of the vein, and so will be incomplete and unreliable. Or again, are the gold values very unevenly distributed throughout the ore? In such a case, samples, unless taken at very close intervals, would no doubt be little more than an indication. But I think that all these points must be considered before making or quoting such a sweeping assertion as that of Messrs. Richards and Bugbee.

Probably in no gold mining centre in existence is mine sampling more systematically and successfully carried out than on the Witwatersrand; and it is invariably found there that the results obtained in ore valuation from systematic mine sampling fully justify the reliance placed in it by mine managers and consulting engineers.

Samples are taken at 5-foot intervals on all workings on the Reef, and large scale stope and assay plans are kept, on which the full particulars of each sample are entered at the spot whence the sample was taken; and the theoretical gold content of any block of ore as calculated from the assay plan always tallied closely, in my experience, with the actual gold extracted from the battery and cyanide works.

In the development of new properties mill tests are never dreamed of, as the system of sampling is considered to give as accurate an idea of the value of the ore as any mill test would.

I was a sampler myself first, and later a surveyor, on two of the best known mines on the Rand; as the one I took the samples, as the other I had the making up of all the returns from the mine, mill, cyanide and assay office, and I can testify to the accuracy with which a valuation of a free milling gold ore can be made by this method, given suitable conditions and proper care.

Furthermore, a one or two ton sample for a mill test, to be really representative of the ore mined, should be taken, like the mine samples, from many different places in the workings, care being taken that the sam-



ples from the different places are approximately equal, to prevent any part of the mine being unduly represented in the composite sample sent to the mill. I will venture to say that in nine cases out of ten no such elaborate selection is practised, the ore for the mill test being taken probably from the bottom of a shaft, or the face of a drive, and, therefore, being of about as much value as one isolated mine sample taken at the same spot would be.

Apologizing for taking up so much of your valuable space,

Yours truly,

J. D. RAMSAY.

Traders Bank Bldg., Toronto, Ont., Feb. 22, 1909.

Editor Canadian Mining Journal:

Dear Sir,—In the Canadian Mining Journal of February 1st, I noticed your paragraph regarding an article written by Mr. Alex. Gray, in which he attempts to instruct the Crown Reserve how to figure its cost of production. Your correspondent says: "I do not care to take sides in this controversy." I wish to state that there has never, at any time, been any controversy between Mr. Gray and myself. As general-manager of the Crown Reserve Mining Company, I presented a yearly report to the stockholders of the company, extracts from which were published by the newspapers. Without taking time to see the report, and probably to demonstrate his "keen scent," Mr. Alex. Gray at once published an article in the Montreal Star, in which he attempted to criticize my statement of costs, a matter with which he was not familiar. The natural result was that his deductions were absurd.

I am, as you know, not a newspaper writer, and have neither the time nor the inclination to start what you call a "controversy," but I know that you are interested in the facts, and that you will "take sides" with the truth, so am enclosing a copy of the ore production and cost sheet taken from my annual report, which gives shipments and values in detail, together with mining costs.

Trusting that this will make the matter clear in your mind, I am,

Yours very truly,

SAMUEL W. COHEN.

## CROWN RESERVE MINING CO.

### Ore Production High Grade 1908

| Ship No.         | Date      | Weight (lbs) | Ounces Silver | Gross Value | Freight & Test | Net Value  |
|------------------|-----------|--------------|---------------|-------------|----------------|------------|
| 1                | Feb 27    | 13,386       | 23,096 82     | 12,711 10   | 1,179 63       | 11,531 47  |
| 2                | May 13    | 39,870       | 170,350 09    | 89,985 63   | 4,212 67       | 85,772 96  |
| 3                | June 15   | 40,538       | 64,948 90     | 34,211 83   | 1,913 42       | 32,298 41  |
| 4                | July 23   | 43,041       | 118,955 20    | 61,217 32   | 3,330 39       | 57,886 93  |
| 5                | Aug 18    | 52,769       | 88,724 10     | 45,171 64   | 2,532 36       | 42,639 28  |
| 6                | Sep 24    | 59,096       | 119,190 49    | 59,878 49   | 3,323 83       | 56,554 66  |
| 7                | Oct 20    | 122,343      | 188,000 40    | 92,002 50   | 5,257 82       | 86,744 68  |
| 8                | " 27      | 55,168       | 58,405 15     | 28,735 30   | 1,729 48       | 27,005 82  |
| 10               | Nov 4     | 78,317       | 162,583 10    | 82,088 14   | 4,289 14       | 77,799 00  |
| 11               | " 14      | 62,720       | 153,773 80    | 77,584 13   | 4,056 72       | 73,527 41  |
| 12               | " 27      | 58,740       | 129,228 00    | 64,937 07   | 3,902 89       | 61,034 18  |
| 14               | Dec 4     | 54,867       | 116,071 00    | 58,325 68   | 4,734 04       | 53,591 64  |
| 15               | " 11      | 57,900       | 115,800 00    | 58,189 50   | 4,796 37       | 53,393 13  |
| 19               | " 22      | 57,821       | 115,642 00    | 58,110 10   | 4,486 60       | 53,623 50  |
| Bullion Sales    |           | 1,542        | 13,122 24     | 6,616 72    | 628 44         | 5,988 28   |
| Sales of Samples |           | 1,763        | 7,678 84      | 3,839 42    | 60 00          | 3,779 42   |
| Totals           |           | 799,881      | 1,645,570 13  | 833,604 57  | 50,433 80      | 783,170 77 |
| Low Grade        |           |              |               |             |                |            |
| 9                | Oct 24    | 69,943       | 91,471 14     | 4,516 57    | 950 30         | 3,566 27   |
| 10               | Nov 4     | 28,088       | 40,323 35     | 2,026 25    | 386 93         | 1,639 32   |
| 11               | " 14      | 51,118       | 56,237 71     | 2,825 92    | 610 90         | 2,215 02   |
| 13               | " 28      | 125,600      | 16,700 00     | 8,391 75    | 1,005 90       | 7,385 85   |
| 16               | Dec 15    | 62,940       | 4,644 15      | 2,333 72    | 660 05         | 1,673 67   |
| 17               | " 17      | 60,000       | 8,437 50      | 4,239 84    | 793 13         | 3,446 71   |
| 18               | " 19      | 64,000       | 4,800 00      | 2,412 00    | 720 72         | 1,691 28   |
| Totals           |           | 461,689      | 53,384 85     | 26,746 05   | 5,127 93       | 21,618 12  |
| Total Production |           |              |               |             |                |            |
| High Grade       | 799,881   | 1,645,570 13 | 833,604 57    | 50,433 80   | 783,170 77     |            |
| Low Grade        | 461,689   | 53,384 85    | 26,746 05     | 5,127 93    | 21,618 12      |            |
| On hand Dec. 31  | *40,000   | 100,000 00   | 50,000 00     | 00          | 5,000 00       |            |
| Total            | 1,301,570 | 1,798,954 98 | 910,350 62    | 55,561 73   | 854,783 89     |            |

(650,785 Tons)

Estimated \*

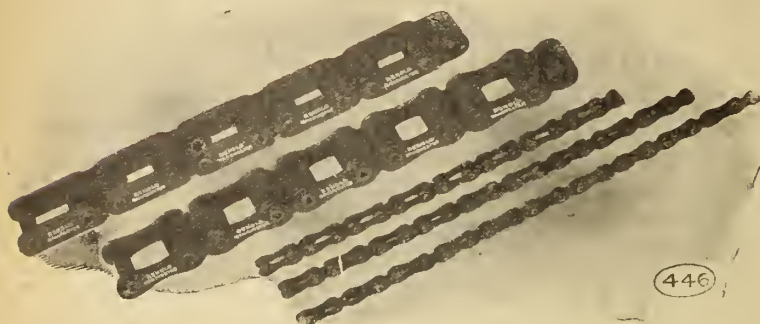
| Value of Ore Per Ton                                                                      |            |        |                    |
|-------------------------------------------------------------------------------------------|------------|--------|--------------------|
| High Grade                                                                                | 4156 71 oz |        |                    |
| Low do.                                                                                   | 231.25 oz  |        |                    |
| Cost of Ore                                                                               |            |        |                    |
| Operating Expenses— including Development and all charges except construction & marketing | 50,406 76  | Per oz | 2.802 <sup>1</sup> |
| Marketing Expenses including smelter deductions                                           |            |        |                    |
| Freight, Treatment, Head Office expenses, handling ore, etc.                              | 84,666 80  |        | 4.706 <sup>1</sup> |
| Total Expenses                                                                            | 135,073 56 |        | 7.508 <sup>1</sup> |
| Total cost of Buildings, Plant and Equipment \$71,000 00                                  |            |        |                    |

### COAL AND COKE DIVIDEND.

A dividend of 1 1-4 per cent., or \$35,000, was paid on the stock of the International Coal and Coke Co., on Monday,

February 1. The company previously paid in dividends \$336,000, which, with the present dividend, makes a total of \$371,000.

## INDUSTRIAL PAGE.



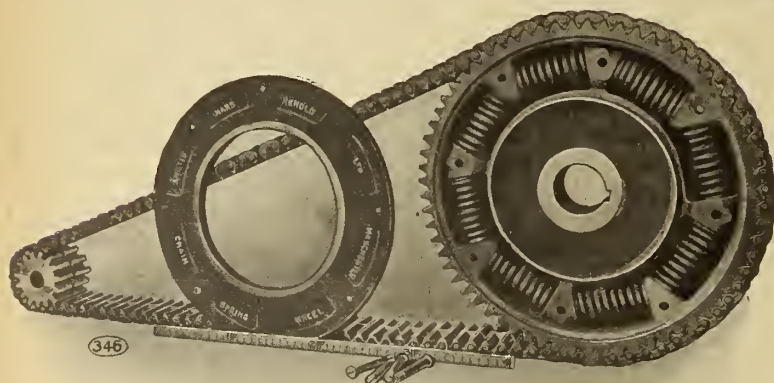
RENOLD BLOCK-CHAIN.

**Renold Driving Chains**—Hans Renold, Ltd., Manchester, England. Jones & Glassco, Montreal, Canadian Agents.

The manufacture of chains for textile machines was begun by Mr. Hans Renold in 1879, with a staff consisting of one man and a boy. In December of the same year a chain was supplied to James Starley for use on his first chain-driven cycle. Since that year the Renold works have grown from a small rent-



RENOLD ROLLER-CHAIN.



RENOLD SPRING-WHEEL PARTLY ASSEMBLED.

ed room into an establishment employing 700 men. The output of the factories is confined to chains, sprockets and sprocket cutters.

Apart from the greater general efficiency claimed for chain-driving, and its known advantages over spur wheels, it is often the only satisfactory method where oil, moisture, or heat are present.

The Renold Catalogue explains fully the principles involved in the three types of chains mostly used, the forms of sprocket teeth, and the principles of chain gearing, etc. Installations of chain-drive in the Renold plant are described at some length, and outside installations are touched on in the concluding section of the catalogue.

The accompanying illustrations will prove interesting to all users of power.

## SPECIAL CORRESPONDENCE

## NOVA SCOTIA.

Glace Bay, Feb. 18.—Eight Hour Commission of Enquiry.—This commission have commenced their tour, and on the 15th of February they visited Cape Breton, taking evidence at the Steel Works in Sydney. The following day the commission visited Sydney Mines. On the 17th and 18th they held sessions at Glace Bay, where evidence was given by representatives of the P. W. A. and of the Dominion Coal Company. Dr. Magill, the chairman of the commission, is a painstaking gentleman, who takes his mission seriously. We think he will make a valuable report.

U. M. W. A. versus P. W. A.—War a l'outrance has been declared between the local labor organization and that from the States. The P. W. A. has lately adopted a stiffened attitude, and is awakening from its lethargy. It is gradually permeating the minds of the miners that for 20 years they have had industrial peace, coupled with a continual industrial development and a steady increase in the standard of living and the rate of wages, and the feeling of apathy with which the inroads of the U. M. W. A. were first regarded is gradually changing to a marked resentment at the present action of that body. Possibly never before in the history of organized labor has one union



made deliberate war upon another. In the present case the U. M. W. A. came uninvited into Nova Scotia, and has made a persistent endeavor to disrupt that province's native labor organization; has attempted through the courts to obtain possession of its accumulated funds, and has harried the native organization by every means in the power of an unscrupulous body of men with purely selfish ends to serve. The indignation of the P. W. A. members is therefore not at all to be wondered at, especially when it is considered that there are whole States in the Union where the miners are unorganized where the energies of the U. M. W. A. might very legitimately be employed.

**Journalese.**—One of the Sydney papers reproduced from some source unknown a beautiful specimen of "journalese" applied to mining. Some of the scientific information conveyed by the gem may be quoted for the guidance of mining students. We are told: "Mining engineers and chemists recognize three kinds of mine gases. They denominate these gases fire-damp, after-damp and white-damp. Fire-damp is the only one of the trio that is explosive. It is a gas given off by coal under the influence of the heat of the earth." This is somewhat interesting, and may be news to students of mine gases. Again, the writer tells us that a careless miner will sometimes tamp his shot with "paper instead of clay," which is the cause of many mine explosions! We are further instructed that after-damp is a non-explosive and irrespirable gas composed of carbo-lic acid gas. It is therefore no wonder it is so deadly. "Carbo-lic acid gas" must be a dreadful mixture. It is eclipsed, however, by white-damp, which our writer goes on to say is "a heavy white vaporous gas, plainly visible to a naked eye. It seeks the ground, and hovers there like the miasmatic vapors one sees where malaria abounds. It is non-explosive, but its fumes are deadly, and he who breathes it perishes instantly." This is truly wonderful, and it is a pity the author of this journalistic triumph did not meet a little white-damp before he commenced to instruct the public as to the nature of mine gases.

#### ONTARIO.

**Cobalt.**—The leases on the Peterson Lake are being worked steadily, and good results obtained. The Kerry Mining Co., which has a lease on the Peterson Lake, has struck a good vein of ore, about two inches wide, carrying cobalt and native silver, at 95 feet in depth.

The Crown Reserve has struck a new vein carrying high-grade silver. This company is installing a new Sullivan straight-line air compressor with a capacity of 1,200 feet of free air per minute.

The new plant at the Cochrane mine commenced operations on the 15th. The plant consists of a 60 h.p. boiler, a 25 h.p. hoist and a four-drill Ingersoll compressor. Sinking has been started in the shaft from the present 50-foot level, and the intention is to carry the shaft to the 150-foot level. The buildings at the mine are all complete, and a force of 16 men are at work.

A surface vein has been discovered on the John Black extension. The discovery consists of a cobalt vein carrying native silver, and varies in width from 9 to 14 inches.

Mr. Geo. M. Colvocoresses has been buying a plant of machinery for the Blackburn mine of Miller Lake. The plant consists of two locomotive boilers of 35 h.p. each, two Ingersoll straight-line compressors, with a combined capacity of 700 feet of free air per minute, two hoists and five drills.

The Bartlett mines in Gowganda has placed an order for ten machine drills.

The Wetlauffer mine in South Lorraine is going to put in a gas producer plant and a compressor.

Isaac H. Johnston, of the Boyd-Gordon property in Gowganda, has placed an order for an 80 h.p. boiler, a ten-drill compressor, a hoist and machine drills.

On the Bailey property, which is operated by the Cobalt Central, a short drift has been driven from the second level. The vein being developed is about 4 inches in width, and carries smaltite and silver. The Cobalt Central Concentrator, with the addition to the machinery, has now a capacity of nearly 100 tons per day.

The Nipissing Reduction Co., which is at present milling the dumps of the Nipissing Mines Co., is treating about 80 tons per day.

The Muggley Concentrator has just finished milling several thousand tons for the Nova Scotia mine. A meeting of the directors is to be held in Toronto on the 18th, and the question of doubling the capacity of the plant will be considered.

Mr. George Vanderbilt, of New York, was in Haileybury on the 14th, consulting with several of the prominent mining men of the district.

Mr. J. Obalski, of Quebec, was in Cobalt for a few days looking over some properties.

#### BRITISH COLUMBIA.

**Rossland.**—The shipments at the Centre Star mine are gradually approaching the standard tonnage, now that the smelter has treated all of the surplus ore that accumulated during the temporary shut-down. During the past week the Centre Star group shipped 3,370 tons, and it is the intention to increase this until the standard figure is again reached. Extensive development work is being done on the 15th and 16th levels of the Centre Star and the other deep levels of the company's property, and it is the intention to ship a much larger tonnage this year than during 1908, provided the copper market remains strong and the red metal approaches a normal price. The production of the Consolidated Mining & Smelting Co. of Canada, Ltd., for the calendar year 1908, embracing operations at the company's mines in Rossland, Moyie, Sandon and Phoenix, and the smelter and refinery at Trail, may be grossly figured at \$5,044,198. The lead stacks at the smelter turned out 51,022 tons, and the copper furnaces produced 267,384 tons. The metallic production was: Gold, 116,314 oz., value \$2,383,327; silver, 2,100,457 oz., value \$1,102,846; copper, 3,753,139 lbs., \$506,460; lead, 35,999,145 lbs., \$1,050,455, making a total of \$5,044,198.

The fuel supply at the Le Roi mine has improved, and most of the regular force has been put back to work again. Development work is being prosecuted with vim on the 1,750-foot level toward locating the continuation of the shoot that has produced such good ore on the 1,650-foot level. The company's consulting engineer, W. A. Carlyle, is in the camp, looking over the work and property of the company. The action of the Board of Directors of this concern in writing off the annual statement old figures that were mere stuffing is to be approved. The Le Roi mine has not yet seen its best days, and it looks as though the present Board of Directors were determined to clear up the office and recording end of the business so that the real situation at the mine can be readily ascertained by the average stockholder. It will no doubt take a little time to accomplish this, but in the end the operation will have a gratifying effect.

At the Giant-California last week W. Y. Williams, of Spokane, consulting engineer, went over the work in the mine. It is said that the results obtained so far in this work have not been all that the operators would like.

Messrs. Whitford and Jenkins have resumed work on the Blue Bird, and will do development work for a while, merely shipping what ore accumulated in the course of this work.

**Boundary.**—The Consolidated M. & S. Co. has resumed shipments to the Trail smelter from the Snowshoe mine. The B. C. Copper Co. shipped a small tonnage from the Oro Denoro last week, this being the first lot sent to the smelter since the cold weather. The manager of the B. C. Copper Co., J. E. McAllister, has gone East to attend the annual meeting, where it is ex-



pected some definite action will be taken in regard to the dividend policy of the company. The net earnings of the British Columbia Copper Co. for December were \$46,500. The production of copper by this concern during the last seven months of the calendar year 1908 was 6,731,351 lbs., and the net earnings were about \$232,609. They have about 6,000 tons of good ore lying on the dumps at the Athelstan mine, Wellington camp, where development work is proceeding with satisfactory results.

The Granby Company will very likely proceed with the work of enlarging the other seven furnaces at the smelter so that they will have the work finished early this summer. When this work is completed the capacity of this big smelter will be increased by over 1,000 tons, giving the company a capacity of 4,500 tons per day. The Granby Consolidated expects to mine and ship 25 per cent. more ore this year than was the case during 1908. The production during 1908 was 23,639,984 lbs. copper, as against 15,514,000 lbs. in 1907 and 19,779,000 in 1906, which was a comparatively heavy year. From this it will be seen the output for 1908 was 8,125,000 lbs., or about 52 per cent. more than in 1907. The Boundary output for 1908 was the heaviest in the history of that district, but 1909 bids to exceed that year unless more than the usual number of drawbacks intervene.

The Reorganization Committee of the Dominion Copper Co. plan to buy in the property of the company at foreclosure sale and transfer it to the New Dominion Copper Co., which will issue the following securities: \$500,000 of 6 per cent. 10-year income bonds, convertible into stock at \$5 par, and 250,000 shares of common stock, par value \$5. It is proposed to give the present bondholders new stock for their bonds on a basis of 210 shares for each \$1,000 bond. This will take up about 168,000 shares of the new stock. The company's creditors will receive 20,000 shares of new stock, in the proportion of 20 shares for each \$100 due them. The present shareholders, upon turning in their old stock and subscribing at par for the new bonds at the rate of \$100 of new bonds for each \$100 of the old stock, will receive a bonus of 10 shares of new stock. This will take about 50,000 shares; the underwriters will take about 12,000 shares, making up the total issue of 250,000 shares. This committee has been authorized to sell the property, if after thorough investigation as to working costs, cost of raising capital, etc., they deem it advisable, but they may not sell for less than \$800,000, so the report goes. It is rumored that the Consolidated Mining & Smelting Co. is making an effort to get hold of the property of this company and work it. The report is, anyway, that the mines will be in operation in five or six weeks.

**Nelson.**—The Montezuma, on Kaslo Creek, Maestro, No. 1, at Ainsworth, and the Bunker are being operated by H. Giegerich. Mr. Giegerich is getting excellent results from his operations on these claims. The management of the Krao Mining Co. is arranging a consolidation of adjacent mining properties with a view to driving a 1,500-foot tunnel into the property, which will tap the ore bodies of the Krao at about 1,200 feet depth, and will at the same time do away with a deterrent factor of mining in that locality—the water, which has flowed into the lower workings of the Krao to such an extent that it is not considered economical to try and pump it. The Krao was sold to Butte mining men about a year and a half ago for \$125,000. The Rambler-Cariboo mine in this district had the same trouble with water in the lower levels until the company drove its long tunnel, and many of the prospects in this locality cannot be worked out account of the heavy volume of water that gushes from the fissures in the rock at certain periods of the year.

The International Coal & Coke Co. paid another dividend of  $1\frac{1}{4}$  per cent. on February 1st, amounting to about \$35,000; this makes a total of \$371,000 profit that the company has shared with its shareholders to that date. The International Coal & Coke Co. has one of the most complete plants in the Crow's Nest district, and has worked steadily along while many of the other

properties have only worked intermittently. This concern has large reserves to open up yet, development work being advanced in this direction as time goes on.

The Yankee Girl Gold Mines Ltd., is shipping the product of the mine to Northport smelter. The future outlook for this property is bright, and the ore body looks better with every "shot" fired. The ore is being sacked—a couple of hundred sacks per day.

The Winslow group in the Lardeau has been bonded for \$60,000. Another gold brick, valued at \$4,000, was shipped from the Queen mine last week. Work is proceeding with the usual regularity at mine and mill at this property.

The spring snowslides in the Slocan have begun to move early, and have already carried away a number of buildings at the Hewitt mine, Silverton.

**Vancouver.**—Mr. C. H. Dickie, president of the Portland Mining Co., states that the company is negotiating for and will soon put in an aerial tramway and smelter at the property, which consists of 12 claims situated at the head of Portland Canal. A strong fissure vein carrying gold, silver and lead, has been developed on 6 of these claims, there being about 20,000 tons of ore available for stoping.

Forty promising mining claims situated at Maple Bay, Portland Canal, have been taken over by the Associated Mining Co., of London, Eng. Considerable development has been done on this group, and about 12,000 tons of good ore shipped out. It is the intention of the above-named company to equip the property and work it on a large scale in the near future.

## YUKON.

**Dawson, Jan. 1.**—The Dominion of Canada can well be proud of the splendid achievement of its most northwesterly domain, Yukon Territory, for the important work it has achieved during the year of 1908 and for the new work it is to undertake during the new year.

While the output of the Yukon Territory has aggregated one hundred and fifty millions during the eleven years of active mining operation, it is hoped that more than this sum will be produced in the next ten years. Not only placer, but quartz and copper are contributing to the mineral output of the Territory.

New methods of mining are coming to the fore as a result of experience and the application of energy and industry. Canada has reaped millions in trade from this territory, and will reap millions more during the next decade. The older provinces well can afford to encourage this coming new province for selfish, if not for more lofty, purposes. While the old time individual miner is being crowded to the outskirts in this territory and is working ground not altogether so rich as was the rule in the past, his invaluable efforts of empire pioneering are unrelaxed, and the heaven will have its effect.

At the same time that the individual is striving to open new placer and new quartz fields, an element new to this territory is taking hold with greater effort than even dreamed of in early days. Capital has come to the aid of the prospector, and many low grade placer and mineral propositions are being brought into the working list.

While quartz enterprises are in their infancy, it is to be chronicled with much significance that this country of scarcely more than ten years' standing in the mining world has some of the finest quartz fields open, and a not insignificant sum invested in working machinery. In the Whitehorse end many tons of copper are being mined and shipped to the smelters daily, and the time rapidly is approaching when this output will be greatly multiplied. The White Pass Railway began during 1908 the construction of a branch line of railway into these copper fields, and intends to push construction again, probably as soon as the snow disappears. It is predicted that this line in time may cross to the Kluane and White River



copper fields, both of which have engaged the serious attention of copper prospectors for several seasons.

The southern end of Yukon also is to be credited with the installation of the first concentrator in the entire Yukon basin from St. Michale to the head. The concentrator is at Conrad, and is working daily in treatment of ores from the Conrad mines, which are controlled and being worked by a syndicate represented by Colonel Conrad. The capacity of the concentrator, the Colonel recently announced, is to be doubled by next season.

The Conrad properties are but a few of the many now held in the Conrad and White Horse districts, and splendid leads are being developed from that part of the country.

In every section of the Yukon as one progresses from the southern end northward the same hopeful spirit prevails among the prospectors, and mineralized properties are being investigated as rapidly as the prospector can carry on the double work of progress and self-sustenance.

Near Dawson the quartz properties have so taken a hold on the faith of the people that scarcely an individual in the country has not awakened to the possibilities, and nearly every other man, whether he be a dweller in city or country, has an interest in hard rock properties.

Although none of the quartz properties near Dawson have progressed like these of the southern end to the condition of production and shipping of ore, some have extensive work under way, and have shipped sample lots. Never was there greater activity in the staking of quartz in the Klondike proper, that is within 50 miles of Dawson, than during the year just ended, and perhaps never were so many people of the country reinvesting their northern earnings in quartz claims in this district as just now.

One of the most promising quartz localities is that of the dome between Dominion Creek and the Hunker-Bonanza side. Nearly the whole ridge is taken, and leads have been followed in many directions along the various side streams. Owners are organizing to develop, and it is expected that the year of 1909 will decide the fate of many claims. From samples of ore obtained from surface leads and from shafts and tunnels of 20 to 50 feet deep, there should be a vast quantity of unusually high-grade gold-bearing quartz in workable quantities in the many miles of the famous old ridge. The most extensive work on these properties so far undertaken is by the Davison people, who are running a tunnel from the 400 ft. level through the mountain. Work has been under way with day and night shifts for some time, and it is expected that mechanical drills will be employed before long.

In the Twelvemile and Lepine districts, along Hunker and Bonanza, particularly at the head of these two streams, and to some extent at the head of Eldorado, the quartz enthusiasts are working. Tunnels are being run in every direction. Certain Dawson people are opening the famous Lone Star again, and declare they are sure of success.

On Williams Creek, Merritt Creek and other streams in the area between Dawson and White Horse much energy is being expended on the opening of copper, and splendid samples have been received in Dawson.

One of the most promising propositions ever tackled in the north is the conglomerate of the Indian River district. Several faithful hard-rock miners have been working there for years, feeling sure they can demonstrate the wealth of the locality. The property is simply a great gravel deposit bound together with a hardened cement, through which is scattered gold. It is conceded that the property is not of high grade, but it is so readily accessible and so vast and unbroken in quantity that it is declared to be one of the safest and surest hard-rock propositions. The Mackinnon Brothers, who have mined on the Rand, declare this a similar proposition, and have demonstrated the richness of the property. Capital already is inter-

ested in various Indian River conglomerates to the extent of testing, and it may be that 1909 will see important results.

From northward of Dawson, even to the Arctic coast, comes news of the ever busy prospector looking industriously for new mines, and eyes are being kept open for quartz as well as placer. The Firth River, in Yukon Territory, flowing into the Arctic Ocean, may be the scene of the next big placer strike. Jim Smith and others are prospecting there, and a number of reports of gold being found on the stream and in the vicinity are drifting back from time to time.

Up the Pelly River, another great valley district of the North, many streams have been proven the last year to carry gold, and prospectors have brought down pannings which, when shown in Dawson, have excited the greatest interest, and stimulated afresh the longing to locate the paystreak.

Bob Henderson, discoverer of the first gold in the tributaries of the Klondike River, has spent the last two summers on the Pelly, and has brought down many small vials carrying samples of gold he secured there on various streams. Henderson intends to make the Pelly his future home, and he declares that it is only a matter of time until the Pelly shows a gold field as productive as the Klondike.

The year of 1908 has seen its greatest operations in the neighborhood of Dawson in the way of hydraulic and dredge mining.

No less than 18 large dredges are at work in the territory, and three to six more are expected to arrive this year. The type of dredges now being brought here cost laid down and ready for operation not less than \$150,000. The gravels which they are working are, on the whole, lower grade than those operated by the old-time individual miners, but are yielding splendid returns.

Some of the dredges ran into such rich pay that they paid for themselves in a half season or less, and it is said that the Bear Creek dredge, on the Klondike River, paid for itself almost within the first month it was operated, and that during the summer of 1908 it did almost as well as in its initial summer. That dredge has handled more gravel than any other in the territory, and has travelled more from its original position. Being in the open river of the Klondike, it worked this fall until November 9, when it shut down only because its fuel supply was exhausted. It was thought that the dredge might have a run until Christmas had it not been for the want of wood.

The dredges on the Guggenheim properties on Bonanza and Hunker worked steadily through the season, driven by electricity from the power station on the Twelvemile River, 30 miles distant. These machines are among the finest types of dredges in the world, and their tailing piles are like mountains. It is understood that the returns have been very satisfactory, particularly on the Anderson concession, and at 90 below, where pay yielding three dollars and more to the yard is said to have been secured on both these properties. One stretch on the ground at the mouth of Bonanza is understood to have run even better than that.

All the dredge companies are progressing, and are planning to expand, a most favorable indication.

The Guggenheims have eight dredges and three electrical conveyors, which are dredges without the barges, and are moved instead on rolling giant steel frames, and operate so that they afford the great advantage of cleaning every inch of bedrock, and getting much gold not obtained by the dredges.

The Bonanza Basin Company has one dredge, which is one of the most fortunate in the country, and works almost in the very townsite of Dawson.

Other rich dredging properties are: Walker's Fork, where Russel King's companies have two fine gold ships; the lower Fortymile, where the Consolidated Gold Dredging Company of Alaska has two dredges making most successful records; the Stewart River Company, recently organized, which has one



dredge ordered, and may order others for this year; and the Yukon Basin Company, headed by former Governor Ogilvie, with one dredge, and holding 120 miles or more of submerged ground, an area greater than that of the Guggenheim holdings in Yukon. The Ogilvie people have one dredge ordered for this year, and may make it three. Dan Matheson, superintendent of the company, leaves in a few days for the outside to confer in regard to the work.

The Consolidated Company in the Fortymile district will have new machines this year, and others may swell the number.

The dredging success has turned many other eyes this way, and numerous rich streams in the Klondike and Fortymile districts, and in the Circle, Fairbanks, and other Yukon fields, are being investigated by agents of various investors.

Several large power schemes are being formulated for the various properties. The rich adjacent coal fields, as well as the splendid water streams, are being brought into the power service, and millions in the aggregate will be expended in getting their energy enlisted.

The hydraulic properties of the many rich streams adjacent to Dawson have been in greatest prominence during the last year. Thirty or forty concerns have hydraulic plants within 50 miles of Dawson, and are working so inexpensively that they are getting profit from a vast area that the old-time miner could

not work at an advantage. All these advances mean increased Yukon output.

The Guggenheims alone have invested \$12,000,000 near Dawson, and will invest several millions more.

The great number of men on ditch, dredge, hydraulic and other mining work, aside from the private enterprises near Dawson, during the summer of 1908, meant the expenditure of millions for wages and supplies. Most of the miners and other employees were induced to remain in the territory for the winter, and the fundamental work of prospecting and opening new properties is thus greatly facilitated.

The extensive work of installation of new dredging and hydraulic plants, including 12 miles of ditch the Guggenheims will build up Bonanza this summer, will mean the distribution of much more money, and ensures grubstakes for an army of prospectors for the next year. By the year 1910, or a year later, the Guggenheims expect to have their great properties working in every portion.

All told, Yukon Territory never was at a more promising stage, and on a more permanent basis. It has begun to produce nearly all the vegetables needed within its borders, and thus will keep a vast sum of money at home.

Reinvestment is becoming more common, capital is headed this way together with labor, and the destiny of the North is assured.

## GENERAL MINING NEWS.

### ONTARIO.

**Cobalt.**—The west drift of the Cobalt Lake mine is out under the lake several hundred feet from the main shaft, at a depth of 154 feet, and is within a very short distance of the boundary of the station grounds.

La Rose is beginning to realize to advantage the large amount of underground development already done, and during the last few months has been blocking out ore much more rapidly by reason of being able to work machines in so many drifts at once on its numerous veins.

The shaft on the Pontiac has been sunk on the vein to a depth of over 25 feet, and 20 sacks of first-class ore have been taken out. The company has installed a small plant, which is now in operation, and night and day shifts are kept at work.

The Crown Reserve has shipped 100 tons of high-grade ore to Beer, Sondheimer & Co., Hamburg. This is the biggest shipment ever sent to Germany, is said to be the most valuable consignment of Cobalt ore ever sent out of Canada for treatment.

The City of Cobalt main shaft is now down 225 feet, and is getting argentite from a vein 8 inches in width. It is said to be the finest argentite seen in camp, and will go about 10,000 ounces of silver to the ton.

While no ore has as yet been shipped from the Ottise, a quantity of valuable ore has been sacked up and stored in the ore-house. This was taken from No. 1 vein in course of development.

The Silver Cross is now working at the 70-foot level on No. 2 vein, where cobalt ore is being bagged.

The Gifford is working night and day shifts, and the main shaft is now down 60 feet and timbered all the way.

The main shaft at the Badger is down 223 feet. It is an incline shaft sunk on the vein for its entire depth. It is a cobalt, calcite and silver vein carrying native silver. The first level is at a depth of 100 feet, and drifting has been done east and west for 224 feet. Stations have been cut at the 200-foot level, and drifting is to be started. The new plant consists of a 12-drill Sullivan compressor and two 100 h.p. boilers, electrical plant, etc.

**St. Catharines.**—Natural gas was struck here at a depth of 200 feet by men boring for pure water on the Kinleith Paper Company's property on the old canal bank. This is the first strike of natural gas at or near St. Catharines. The boring will continue.

### ALBERTA.

**Lethbridge.**—The Scranton Coal Mining Co. and the Central Mining Co. have consolidated under the name of the Scranton Coal Company. This company controls 1,500 acres of coal lands, and is now producing at the rate of 500 tons per day, and expects to raise the output from 800 to 1,000 tons per day within a month.

**Frank.**—The C. A. C. & C. Co. are at work developing the coal deposits half way between Turtle and Goat Mountains. Four years ago a shaft was sunk some 300 feet. A powerhouse was built, but was abandoned. Now the company are pumping out the shaft and use it as an air shaft. They intend sinking another shaft to strike the vein and operate it as a new development. The company have about 150 men at work at present.

### BRITISH COLUMBIA.

**Rossland.**—W. A. Carlyle, consulting engineer of the Le Roi Co., is engaged in making an examination of the workings for the purpose of outlining a further plan of development. The explorations in the Le Roi continue on the 1,750-foot level for the purpose of locating the ore shoot, which is now being operated satisfactorily on the 1,650-foot level.

The Rossland Miner," in answer to a correspondent inquiring concerning the Big Four mines and an emergent call issued by the Big Four management for more money, has the following to say: "So far as operations of this company are concerned, no work is now in progress on its properties in this camp, nor has there been any that we know of for several years past. We have no means of knowing how much money has been collected by the management of the Big Four in the shape of assessments or from the sale of shares, but is a certainty that the amount expended on the properties for the past five years has been



small." In the opinion of the "Miner" the Big Four Company is a "wildcat" concern, pure and simple, and the constant raising of funds by means of assessments and so-called "emergency calls" is nothing less than fraudulent.

**Trail.**—Mr. W. H. Aldridge, manager of the Trail smelter, which is owned by the Canadian Pacific Railway, regarding the company's mineral and smelting properties in the West announced that the company has made a long contract for the whole of the Le Roi No. 2 output at Rossland, something like 100 tons of ore per day, for treatment at the smelter. As this mine ships the highest grade ore in the Rossland camp and has paid dividends for a long period regularly, it is felt that a good stroke of business has been done.

"The company is now treating 40,000 tons of ore per month at the Trail smelter," Mr. Aldridge says, "and the gross value of the monthly output is over \$400,000, \$4,800,000 worth per annum, of which 40 per cent. is gold, 22 per cent. silver and lead each, and 16 per cent. copper.

"The ores are being supplied largely from the company's properties which are located in the Boundary, Rossland, East Kootenay and Slocan districts. The company also occasionally purchases copper ores from Idaho.

"So far as the general condition of the mining industry in the Canadian West is concerned, Mr. Aldridge says that notwithstanding the present low price of copper, lead and silver, the output of the mines continues large, and the general result under the circumstances is fairly satisfactory.

"The coal mines in British Columbia and Alberta are working at their full capacity, and everything indicates that the consumption will continue large.

"The C. P. R., which began the development of its own coal areas not long ago, has now a large installation, including steel pipe and coke ovens, at Hosmer, and are increasing their output from the property slowly.

"Most gratifying results are being obtained from the new method that has been adopted at the Bankhead mine in Alberta, where hard coal dust, which formerly went to waste, is being turned into an exceedingly profitable output. The consumption of soft coal dust for steam purposes has long been a practical proposition, but hard coal dust long defied manipulation. Five hundred tons per day of briquettes which are made from hard coal dust are now being produced and used for locomotives as well as domestic purposes."

**Phoenix.**—Granby officials estimate an increase in copper output during 1909 of 25 to 30 per cent. The enlargement of the furnaces will be finished by June, and will give a smelting capacity of from 4,500 to 5,000 tons per day as against 3,200 at present.

The B. C. Copper Company's production for the calendar year 1908 amounted to 6,731,351 pounds. This is for the last

seven months only, as the mines were closed down during the first five months of the year.

A 5-foot ledge of copper ore has been cross-cut on the Woodburn property of the Phoenix Mining, Smelting & Development Co. The tunnel has now reached a distance of 450 feet.

**Nelson.**—James McMartin has taken over the bond on the Kootenay Belle and Mother Lode groups in Sheep Creek, and a new era is expected in the development of that camp.

A company with the title of the Osoyoos Mining Co., Ltd., has been formed to take over a group of coal properties near Princeton in the Similkameen Valley. The company owns about 1,900 acres of land situated between the Similkameen and Tulameen Rivers. Considerable drilling has been done, and one hole bored to a depth of 863 feet passed through 17 seams with an aggregate thickness of 50 feet 6 inches. It is expected that the V., V. & E. Railroad will, in the near future, pass alongside the mines.

**Vancouver.**—The reorganization committee of the Dominion Copper Company has formulated a reorganization plan based on the committee's opinion that the large amount of new capital required to develop the property and the small profits from the low grade ore may make it advisable to sell the property. The plan of reorganization is for the committee to purchase the property at foreclosure sale and transfer it to the new Dominion Copper Company, which will issue the following securities: Five hundred thousand dollars at 6 per cent. ten year income bonds convertible into stock at par, \$5 per share; 250,000 shares of common stock of par value of \$5 per share. Present bond holders will take new stock for their bonds on the basis of 210 shares of new stock for each \$1,000 bond. This will absorb 168,000 shares of new stock. Creditors will receive 20,000 shares for each \$100,000. Present stockholders subscribing at par for the new bonds on the basis of 100 of bonds for each \$1,000 of present shares will receive a bonus of 10 shares of new stock for each 100 shares of the present stock. Underwriters will receive 12,000 shares of the new stock. If the committee deems it advisable to sell the property it is restricted to a minimum price of \$800,000.

**Nanaimo.**—The South Wellington Coal Mines Co. is making steady progress. One hundred men are at work in the mines and as many more are engaged in construction about the property. At present several hundred tons are being mined weekly and this output will be greatly increased as the mine is opened.

**Barkerville.**—The Canadian Creek Mining Company has purchased the machinery on the derelict Seymour Baker dredge at Quesnel. This machinery will be installed on Slough Creek, where prospect shafts have been sunk and satisfactory results obtained.

## MINING NEWS OF THE WORLD.

### GREAT BRITAIN.

A colliery disaster occurred at West Stanley, about 12 miles from Newcastle-on-Tyne, on Feb. 16th. Two explosions were followed by a fire, which prevented any attempt at rescue for some time. Finally a rescue party sent down the following day succeeded in bringing up 37 men alive. About 110 lives were lost.

The first colliery rescue station in South Wales was opened at Aberaman on Jan. 23rd.

The tin alluvial deposits of Cornwall, which have not been worked for some time under the impression that they were exhausted, are now receiving attention. Operations recently begun on Goss and Tregoss moors in Central Cornwall have been successful in extracting tin in paying quantities.

The Minister of Labor will introduce a measure in the Legislature dealing with miners' pensions. The project under consideration provides for a minimum pension of 360 francs per annum at 60 years of age. The funds will be provided by contributions from employers and workmen supplemented by Government subsidies.

### GERMANY.

The production of coal in Germany for 1908 was 148,621,201 tons, an increase of 5,398,315 tons as compared with the output of 1907. The output of coke for the year fell off from 21,938,038 tons to 21,174,956 tons.

The annual congress of German miners opened at Berlin on Feb. 1st about 300 delegates being in attendance. A resolution



was unanimously adopted demanding Imperial legislation for the supervision of collieries by independent inspectors, representatives of the mines having no connection with colliery owners.

#### RUSSIA.

On the western portion of the Amur Railway, now under construction, gold has been discovered in such quantities that the laborers are quitting their work to search for gold and have been largely successful. The Government proposes to station troops along the line to protect the gold deposits.

Extensive deposits of wolframite and precious stones have been found on the Shirloff Hill, near Borsya Station, in the neighborhood of Manchuria.

#### AUSTRIA.

A deposit of coal has been discovered near Grain-an-der-Donau, Lower Austria.

The Nordbahn Railway has erected 144 Hoffmann coke ovens in four batteries at Vienna.

#### ITALY.

The British Consul at Palermo reports that the Sicilian sulphur trade has not been affected in any way by the recent earthquake.

#### AUSTRALASIA.

The Broken Hill labor dispute is being adjudicated by the Federal Arbitration Court at Melbourne. Two men have been sentenced to six months' imprisonment each for assaulting officials of the Broken Hill Proprietary mine.

The finding of a gold nugget of 81½ oz. at Talga Talga, Western Australia at a depth of 9 feet is reported.

The mineral production of New South Wales for 1908 is valued at £8,609,607. The gold output was 224,792 oz. valued at £954,854. The yield of coal was a record one, being 9,147,025 tons valued at £3,353,093, the production having doubled during the last ten years.

#### SOUTH AFRICA.

A large company is being found in London for the purpose of establishing electrical works in the Rand on an extensive scale. The capital will be in the neighborhood of £2,000,000. The company intends to supply power to the mines.

Several syndicates found for the purpose of working the mica deposits in the Zoutpansberg district have proved failures owing to the heavy expenses curtailed by lack of railway facilities, and the insufficient working capital available. Another enterprise of this character has been undertaken to work claims covering 334 acres on the Oliphant River.

The gold output of the Transvaal for 1908 was 7,052,617 oz. valued at £29,957,610, which constitutes a new record. The production of 1907 was 6,451,384 oz. of the value of £27,403,738.

#### UNITED STATES.

Heavy snow and rain storms on the Pacific Coast have caused considerable interruption to mining and smelting operations. Many plants were obliged to close down.

The Phelps-Dodge copper smelting companies have filed complaints with the Interstate Commerce Commission at Washington against the Baltimore & Ohio and other railroads, alleging discrimination in transportation rates for coke shipped to smelters in Texas and Arizona.

The new 87-ft. blast furnace of the Washoe smelter in Deer Lodge Co., Montana, claimed to be the largest in operation in the world, was recently blown in. The two other blast furnaces are 51 ft. in length. The smelter is producing from 300 to 400 tons of copper daily.

The new electrolytic plant of the Elkhorn Electro-Metals Co., Jefferson County, Montana, was put in operation early in February.

The United States Steel Corporation has decided to introduce the Heroult electric furnace and steel process. One 15-ton Heroult furnace will be built at the South Chicago works of the Illinois Steel Co. and one of the same capacity at the Washburn & Moon plant at Worcester, Mass., in connection with the American Steel & Wire Co.

#### MEXICO.

A revival of the zinc industry of Chihuahua is noted as a result of an American decision placing carbonate in the calamine class as duty free for importation into the United States. Several large American firms have closed contracts with zinc producers and a number of mines are under option.

The old Promontorio silver mine in the Cusihiuriachie camp, Chihuahua, has been acquired by the Potter-Palmer estate, of Chicago, for \$125,000.

## COMPANY NOTES.

#### NOVA SCOTIA STEEL CO.

Nova Scotia Steel Co. will not resume dividends at present on the common stock. The profits of the company for the year 1908 were \$734,701.53, as compared with \$944,790.66 for the year 1907. The amount at the credit of profit and loss account on January 1st, 1907, was \$1,202,604.39, which, with profits for the year 1908, make a total of \$1,937,305.92 to credit of profit and loss account on December 31, 1908. Out of this sum \$76,745.50 has been transferred to the credit of special reserve funds, of which \$50,000 is the usual allowance for depreciations, and \$13,745.50 is for blast furnace renewals (being 25 cents a ton on the output of pig iron during the year), and \$13,000 is for depreciation in the value of ships. The balance to the credit of the special reserve accounts is now \$857,225.93.

The balance carried forward to the credit of profit and loss is \$1,219,221.07, as compared with \$1,202,604.39 on the 1st of

January, 1908. The sum of \$321,735.08 has been expended during the year on capital account.

#### DIVIDEND PASSED.

The directors of the Silver Queen Company, at the annual meeting recently, under the advice of President Culver, decided to pass the dividend for the current quarter.

The company has hitherto paid 12 per cent. in 3 per cent quarterly dividends, and on two occasions bonuses were added.

F. L. Culver, the president of the company, discussing the action of the directors, said: "It was entirely on my advice that the directors decided not to pay the usual dividend. We have plenty of money on hand, but we have run into a lean streak, such as most mines experience in their development. In the interest of the shareholders I thought it wise to hold the money we have in order to keep up the development until we got into good paying ore again."



Mr. Culver thought that with active work the mine would again be put into a condition entirely satisfactory to the shareholders.

#### RIGHT-OF-WAY ANNUAL MEETING.

The directors of the Right of Way Mining Company announced at the annual meeting that the company is to be placed on a 6 per cent. quarterly dividend basis, with whatever bonus in addition may be considered advisable.

It was decided that for the quarter ending March 31 of this year a 6 per cent. dividend along with a 9 per cent. bonus, will be paid. The shareholders of the company, regarded as one of the luckiest of the many Cobalts, listened to a statement of the year's operations, showing that the value of the output was \$218,000 and the portion paid to the Temiskaming & Northern Ontario Railway Commission totalled \$49,000.

After all the expenses incidental to development, etc., were paid, there was a net balance of \$83,000, out of which two 7 per cent. dividends were paid. The balance, along with that carried from the previous year, leaves \$154,000 to the credit of profit and loss. Included in that is the amount of the La Rose judgment.

The board of directors elected were as follows: Messrs. Geo. Goodwin, T. A. Beament, A. W. Fraser, K.C., Dr. J. F. Kidd, all of Ottawa, and J. G. Turriff, M.P.

#### BIG SIX COMPANY DIVIDEND.

It is reported that the Big Six Silver Cobalt Mines, Ltd., have sold four of their mining claims. The company have authorized the payment of a dividend from the proceeds of this sale. They have retained ten properties, which they propose to develop, including one at Miller Lake and one adjoining that of the Mother Lode Mining Co. at Elk Lake. On the Elk Lake claim a shaft has already been sunk 75 feet on an eight-inch calcite vein, and it is intended to continue this shaft to the 150 foot level.

#### BUFFALO MINES BONUS.

The Buffalo Mines, Ltd., have declared an extra dividend of 1 per cent., payable March 1, 1909, to stockholders of record Feb. 20, 1909.

La Rose net earnings for January were at the rate of 19 per cent. per annum, the result being obtained from ore averaging considerably less than \$300 per ton, and very little stoping being done.

In these net figures allowance also is made for all expenditure on affiliated properties, which is, therefore, being charged against the earnings of the one claim.

#### TEMISKAMING MINING CO.

The annual meeting of the Temiskaming Mining Co. was held on Feb. 20th. The financial statement presented was highly satisfactory and met with the unanimous approval of the shareholders present.

There was no decision in regard to the dividend for the current quarter, and it is supposed that this will be at the regular rate of 24 per cent. per annum. The quarterly dividend will be made on March 6. The election of directors resulted as follows: President, B. E. Cartwright; R. T. Shillington; vice-president; Alex. Faskin, secretary-treasurer, and J. L. Wheeler and R. A. Cartwright.

#### NIPISSING'S CASH ASSETS.

On February 1st Nipissing had in its treasury, after the payment of \$300,000 dividends, \$755,000 in cash. Before the time arrives for the next dividend this item should have again reached the \$1,000,000 mark.

#### McKINLEY-DARRAGH ANNUAL MEETING.

At the annual meeting of shareholders of the McKinley-Darragh-Savage mines, held here, a financial statement for the year was presented, showing cash in hand Jan. 1, 1908, of \$111,448.72, receipts from sales of ore \$345,792.01, interest \$2,287.65, total \$459,528.38. Of this amount additions to plant took \$46,231.39, operation and development \$139,921.66, dividend \$202,309.71, directors' fees \$150, salaries \$13,026.90, and other expenses \$11,276.02, leaving cash on hand at the end of 1908 of \$46,612.70. It will be noticed that no mention is made in the above figures of the amount of ore in transit, or due from the smelters to the mine. It is understood a large payment was made by the smelters to the McKinley-Darragh Company, after the above figures were computed.

## STATISTICS AND RETURNS.

#### BRITISH COLUMBIA ORE SHIPMENTS.

The following are the shipments for the week ending Feb. 6th, 1909 and year to date in tons.

##### Boundary Shipments.

|                       |        |         |
|-----------------------|--------|---------|
| Granby . . . . .      | 21,941 | 89,115  |
| Mother Lode . . . . . | 9,744  | 39,564  |
| Boundary . . . . .    | 19     | 19      |
| Snowshoe . . . . .    | 4,655  | 13,081  |
| Other mines . . . . . | .....  | 1,071   |
| Total . . . . .       | 36,359 | 142,850 |

##### Rossland Shipments.

|                                |       |        |
|--------------------------------|-------|--------|
| Le Roi No. 2 . . . . .         | 1,095 | 2,487  |
| Le Roi No. 2, milled . . . . . | 260   | 1,140  |
| Centre Star . . . . .          | 3,764 | 9,315  |
| Other mines . . . . .          | ..... | 3,054  |
| Total . . . . .                | 5,119 | 15,996 |

#### Slocan-Kootenay Shipments.

Total . . . . . 3,091 15,819  
The total shipments for the past week were 44,560 tons, and for the year to date 271,297 tons.

##### Granby Smelter Receipts.

##### Grand Forks, B.C.

|                  |        |        |
|------------------|--------|--------|
| Granby . . . . . | 21,941 | 89,115 |
|------------------|--------|--------|

##### B. C. Copper Co.'s Receipts.

##### Greenwood, B.C.

|                       |        |        |
|-----------------------|--------|--------|
| Mother Lode . . . . . | 9,744  | 39,564 |
| Snowshoe . . . . .    | 2,630  | 3,850  |
| Other mines . . . . . | .....  | 1,050  |
| Total . . . . .       | 12,374 | 44,464 |

##### Consolidated Co.'s Receipts.

##### Trail, B.C.

|                 |       |        |
|-----------------|-------|--------|
| Total . . . . . | 7,399 | 26,141 |
|-----------------|-------|--------|

**Le Roi Smelter Receipts.****Northport, Wash.**

|                   |     |       |
|-------------------|-----|-------|
| Other mines ..... | 536 | 4,582 |
|-------------------|-----|-------|

The total Smelter receipts from the various mines for the past week were 30,053 tons, and for the year to date 114,751 tons.

The following are the shipments for the week ending Feb. 13th, 1909 and year to date in tons:—

**Boundary Shipments.**

|                   |        |         |
|-------------------|--------|---------|
| Granby .....      | 25,569 | 114,684 |
| Mother Lode ..... | 16,360 | 55,924  |
| Snowshoe .....    | 4,152  | 5,230   |
| Oro Denoro .....  | 60     | 1,650   |
| Other mines ..... |        | 221     |

|             |        |         |
|-------------|--------|---------|
| Total ..... | 46,141 | 177,512 |
|-------------|--------|---------|

**Rossland Shipments.**

|                            |       |        |
|----------------------------|-------|--------|
| Le Roi No. 2 .....         | 1,107 | 3,594  |
| Le Roi No. 2, milled ..... | 260   | 1,300  |
| Centre Star .....          | 2,307 | 11,722 |
| Le Roi .....               | 1,351 | 4,313  |
| Other mines .....          |       | 92     |

|             |       |        |
|-------------|-------|--------|
| Total ..... | 5,025 | 21,021 |
|-------------|-------|--------|

**Slocan-Kootenay Shipments.**

|             |       |        |
|-------------|-------|--------|
| Total ..... | 3,807 | 19,487 |
|-------------|-------|--------|

The total shipments for the past week were 54,973 tons, and for the year to date 318,020 tons.

**Granby Smelter Receipts.****Grand Forks, B.C.**

|                   |        |         |
|-------------------|--------|---------|
| Granby .....      | 25,569 | 114,684 |
| Mother Lode ..... | 7,308  | 54,180  |
| Snowshoe .....    | 2,050  | 30,320  |
| Oro Denoro .....  | 30     | 1,080   |

|             |        |         |
|-------------|--------|---------|
| Total ..... | 34,957 | 200,364 |
|-------------|--------|---------|

**B. C. Copper Co.'s Receipts.****Greenwood, B.C.**

|                   |       |        |
|-------------------|-------|--------|
| Mother Lode ..... | 9,053 | 48,617 |
| Oro Denoro .....  | 30    | 1,080  |
| Other mines ..... | 496   | 3,850  |

|             |       |        |
|-------------|-------|--------|
| Total ..... | 9,579 | 53,547 |
|-------------|-------|--------|

**Consolidated Co.'s Receipts.****Trail, B.C.**

|             |       |        |
|-------------|-------|--------|
| Total ..... | 6,628 | 31,544 |
|-------------|-------|--------|

**Le Roi Smelter Receipts.****Northport, Wash.**

|                   |       |       |
|-------------------|-------|-------|
| Le Roi .....      | 1,351 | 4,313 |
| Other mines ..... | 160   | 1,780 |

|             |       |       |
|-------------|-------|-------|
| Total ..... | 1,511 | 6,093 |
|-------------|-------|-------|

The total smelter receipts from the various mines for the past week were 52,675 tons, and for the year to date 291,548 tons.

**CROW'S NEST PASS COAL OUTPUT.**

The output for the collieries of the Crow's Nest Pass Coal Company for the week ended Feb. 20th was 16,488 tons, or a

daily average of 2,748 tons. For the corresponding week of last year the output was 21,205 tons, a daily average of 3,534 tons.

**COBALT ORE SHIPMENTS.**

Following are the weekly shipments from Cobalt camp, and those from Jan. 1st, 1909, to date:—

|                                | Week ending<br>Feb. 13.<br>Ore in lbs. | Since<br>Jan. 1.<br>Ore in lbs. |
|--------------------------------|----------------------------------------|---------------------------------|
| Buffalo .....                  |                                        | 88,280                          |
| Coniagas .....                 |                                        | 271,905                         |
| Crown Reserve .....            | 41,970                                 | 595,210                         |
| Cobalt Central .....           |                                        | 81,238                          |
| Chambers-Ferland .....         |                                        | 142,000                         |
| City of Cobalt .....           | 61,000                                 | 279,930                         |
| Kerr Lake .....                |                                        | 205,097                         |
| King Edward .....              |                                        | 53,920                          |
| La Rose .....                  | 194,140                                | 1,749,560                       |
| McKinley-Darragh .....         | 40,000                                 | 308,080                         |
| Nipissing .....                | 128,957                                | 1,308,122                       |
| Nova Scotia .....              |                                        | 401,390                         |
| Nancy Helen .....              |                                        | 40,000                          |
| Peterson Lake .....            |                                        | 81,560                          |
| O'Brien .....                  |                                        | 127,880                         |
| Right of Way .....             |                                        | 244,715                         |
| Silver Queen .....             | 65,000                                 | 65,000                          |
| Temiskaming .....              |                                        | 310,000                         |
| Trethewey .....                | 92,530                                 | 277,930                         |
| Temiskaming & Hudson Bay ..... |                                        | 324,060                         |
| Muggley Conc. ....             |                                        | 72,900                          |

The total shipments for the week ending Feb. 13 were 623,597 pounds or 306 tons.

**SILVER PRICES.**

|                  | 1909. | New York.<br>cents. | London.<br>pence. |
|------------------|-------|---------------------|-------------------|
| February 6 ..... |       | 52 $\frac{3}{8}$    | 24 $\frac{1}{8}$  |
| " 8 .....        |       | 52 $\frac{1}{4}$    | 24 1-16           |
| " 9 .....        |       | 52 $\frac{1}{8}$    | 24                |
| " 10 .....       |       | 51 $\frac{7}{8}$    | 23 15-16          |
| " 11 .....       |       | 51 $\frac{3}{4}$    | 23 $\frac{7}{8}$  |
| " 12 .....       |       |                     | 23 $\frac{3}{4}$  |
| " 13 .....       |       | 51 $\frac{1}{2}$    | 23 $\frac{3}{4}$  |
| " 15 .....       |       | 51 $\frac{1}{2}$    | 23 $\frac{3}{4}$  |
| " 16 .....       |       | 51 $\frac{1}{4}$    | 23 $\frac{3}{8}$  |
| " 17 .....       |       | 51 $\frac{3}{8}$    | 23 11-16          |
| " 18 .....       |       | 51 $\frac{3}{8}$    | 23 9-16           |
| " 19 .....       |       | 50 $\frac{3}{4}$    | 23 $\frac{3}{8}$  |

**MARKET REPORTS.**

Feb. 19.—Connellsville coke, f.o.b., ovens:—

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**Metals.**

Feb. 19.—Tin, Straits, 28.25 cents.

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Lake, arsenical brands, 13 to 13.25 cents.

Electrolytic copper, 12.87 $\frac{1}{2}$  to 13 cents.

Copper wire, 15.25 cents.

Lead, 4.02 $\frac{1}{2}$  cents.

Spelter, 4.90 cents.

Sheet zinc, 7.50 cents.

Antimony, Cookson's, 8 cents.

Aluminium, 22 to 24 cents.

Nickel, 40 to 47 cents.

Platinum, \$22.50 to \$23.50 per ounce.

Bismuth, \$1.75 per pound.

Quicksilver, \$44.50 per 75 lb. flask.



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Persons working mines must send in yearly reports of their operations to the Government.

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## OF CANADA

### Synopsis of Canadian North-West Mining Regulations

**COAL**—Coal mining rights may be leased for a period of 21 years at an annual rental of \$1 per acre. Not more than 2,560 acres shall be leased to one individual or company. A royalty at the rate of five cents per ton shall be collected on the merchantable coal mined.

**QUARTZ**—A person 18 years of age, or over, having discovered mineral in place may locate a claim 1,500 x 1,500 feet.

The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year, or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey made, and upon complying with other requirements, purchase the land at \$1 per acre.

The patent provides for the payment of a royalty of 2½ per cent. on the sales.

Placer mining claims generally are 100 feet square; entry fee \$5, renewable yearly.

An applicant may obtain two leases to dredge for gold of five miles each for a term of twenty years, renewable at the discretion of the Minister of the Interior.

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles. Rental \$10 per annum for each mile of river leased. Royalty at the rate of 2½ per cent. collected on the output after it exceeds \$10,000.

**W. W. CORY, Deputy of the Minister of the Interior**

N. B.—Unauthorized publication of this advertisement will not be paid for.

*When answering Advertisements please mention THE CANADIAN MINING JOURNAL.*



# The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch. If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertisers kindly mention this Journal.

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Canadian Rand Drill, Ltd.  
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Ingersoll-Sergeant of Canada  
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Peacock Bros.

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## MANUFACTURERS

of Steel Castings of all kinds, Springs, Frogs and Diamond Crossings

*We make a specialty of*

## Manganese Steel Castings

*for Mining purposes.*

AGENTS FOR

THOMAS FIRTH & SONS, Limited

"Speedicut" high speed steel, tool steel, axe steel, saw steel, files, etc. A large stock carried in our Montreal warehouse.

Also Agents for Barrow, Haematite Steel Company, of Barrow in Furness, England.

Steel Rails of all kinds, Fish Plates, etc.

# RAMPART CEMENT

Perfectly Sound. Never swells or bursts.

Reliable for all purposes for which hydraulic cement is used.

Fineness 92 per cent. through a 200 mesh sieve.

Strength up to standard specifications, and permanent.

Used by the leading Mining Companies of the Maritime Provinces.

## Sydney Cement Co., Ltd.

*Rampart Brand*

**SYDNEY, NOVA SCOTIA, CANADA**

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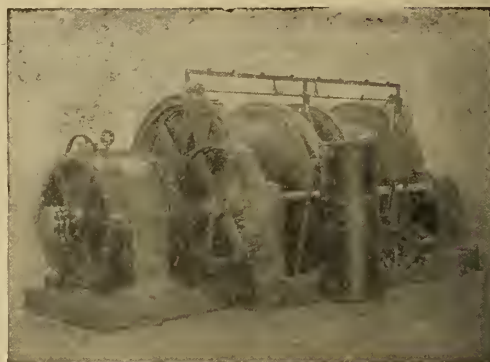
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## Individual Motor-Drive for Mines

Leaving superior efficiency  
out of the question

two points strongly favoring Westinghouse motor-driven mine hoists and other apparatus, are the flexibility of location and simplicity of connection to the service supply, requiring only small wires, which may be readily located and extended or moved, with little trouble, as frequently as desired.



Westinghouse Motor Driving Leyner Mine Hoist.

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MANUFACTURERS OF

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Safety Fuse, Electrical Fuses, Batteries, and other  
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Three Post Magneto Electric Blasting Machine

## NOBEL GELIGNITE A New High Explosive

It always breaks cleanly to the bottom of the drill holes.  
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A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

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Holes at Floor Level or Roof Level or in any intermediate position in Coal or Dirt Band, &c.

Equally suitable for Holing and Shearing.

The Lightest Coal Cutter in the Market.

Nearly 700 Machines at work. 93 in use by one Canadian Company.

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Weight 22 lbs. Bores 6 ft. Deep.

Automatically Rotates the Drill; Steel and lows out the Cuttings  
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**SOLE MAKERS**

**The Hardy Patent Pick Co., Limited**  
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Stocks of these machines kept by Messrs. A. C. Thompson  
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## WHY NOT TRY A "CLEVELAND" STOPE DRILL

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BULLETIN 40

**The Canadian Cleveland Drill Co.**  
Limited.  
COBALT, ONT.





## JEFFREY Electric Locomotives Coal Cutters & Rotary Drills

constitute an essential feature in every Coal Mine where modern, serviceable and economical machinery is required

The following Bulletins will be mailed on request.

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combine qualities which make them the most successful medium used for the continuous haulage of mine cars.

Descriptive Bulletin x21.

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Complete Coal Mine and Tipple Equipments

**The Jeffrey Mfg. Company**

Columbus, Ohio, U.S.A.

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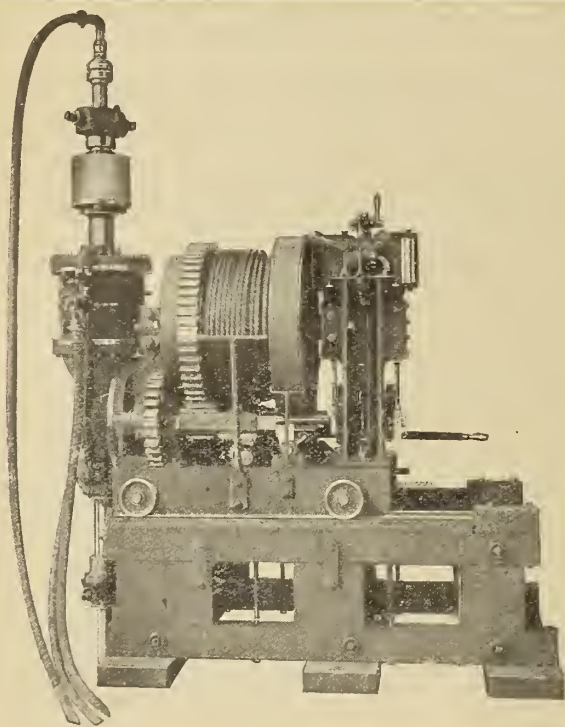


## Sullivan Diamond Drills

represent the most accurate and economical method of searching for new bodies of ore and of learning the extent of those already known.

The core furnishes a trustworthy record of the formations pierced by the drill, and may be kept for permanent reference.

The Deepest Hole ever bored  
With a Core Drill in North  
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for a copy.



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HOISTS - - - COAL CUTTERS

# SULLIVAN MACHINERY CO.

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CHICAGO, ILL.

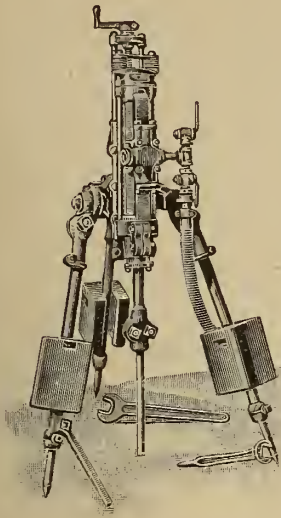
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## ROCK DRILLS

2¾ in. x 6¼ in., 3 in. x 6 in., 3½ in. x 6 in., 3¼ in. x 7¼ in., slightly used.

## HOISTING ENGINES

5 in x 7 in., 6½ in. x 8 in., 7 in. x 10 in., 8 in. x 12 in. Double cylinder, single drum.

## AIR COMPRESSORS

6 in. x 6 in. and 12 in. x 12 in. Steam actuated.

## LOCOMOTIVE BOILERS

28, 35, 40 and 50 h.p.

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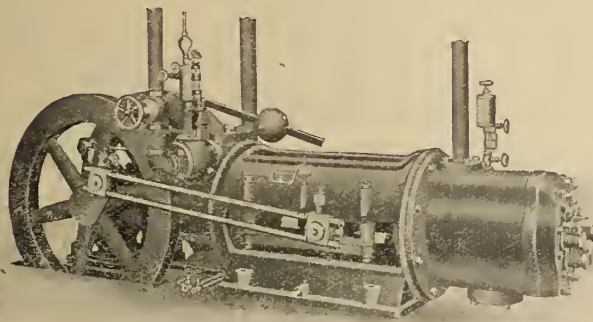
All standard sizes in stock.

## The A. R. Williams Machinery Co., Limited

Head Office: TORONTO, Branches: MONTREAL, WINNIPEG, VANCOUVER.

Manufacturers, Importers, and Dealers in all kinds of Engines, Boilers, Machinery and Supplies.

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This Compressor was designed to meet the demands for a portable self-contained machine of simple construction, yet capable of operating efficiently with the least amount of erection, attention, or repairs. It is extensively used for mining, prospecting, and where an undeveloped property does not warrant great initial outlay, rock excavation, and other contracting work, structural steel or timber erection, pumping and, to a limited extent, in small industrial plants where circumstances will not permit of the installation of a Duplex Compressor and belt power is not available.

The Class "C" Compressor is of the double connecting rod type. It contains many distinguishing features from other machines of the same type. Comparison with straight line compressors with box beds will show that instead of the cylinders being bolted to the bed and held in place by dowel pins, with consequent shearing strains on the frame bolts and liability to get out of line, the cylinders and frame are bolted together with vertical flanged joints, thus producing a machine of the strongest possible construction. The frame is carried up to the tops of the cylinders, giving strength at the point of greatest strain, in contrast to machines of the box bed type which are cut away at that point and require tie rods between the cylinders to keep them rigid. Owing to our self-contained design very little foundation is required.

We cannot give here a full comparison of the machine with others of the same type, but our latest catalog contains a complete description. Send for a copy.

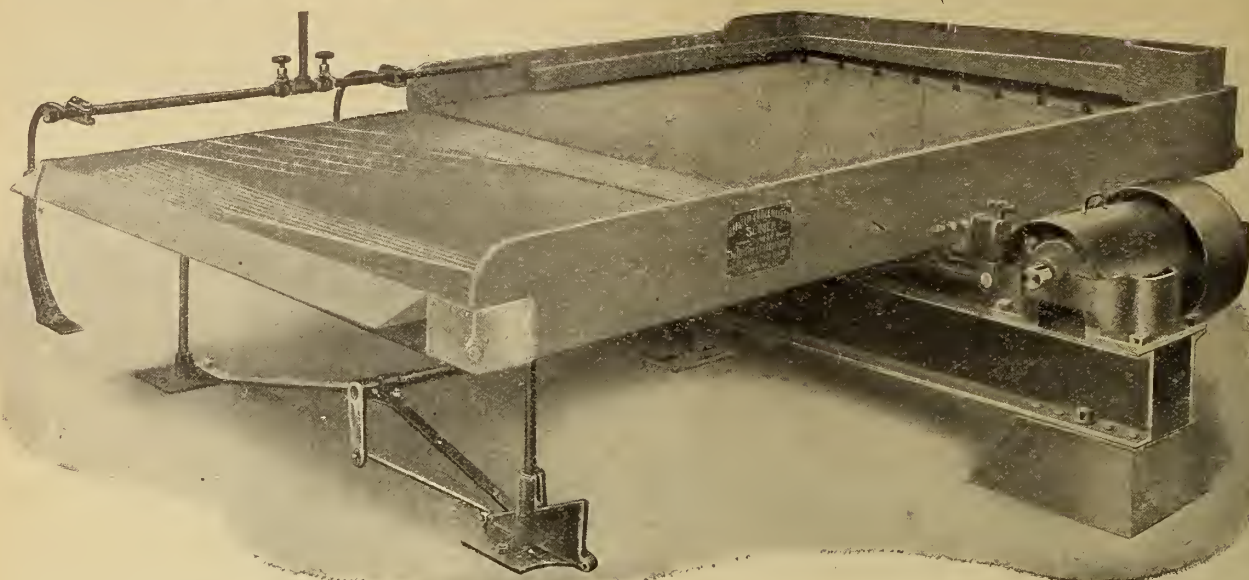
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Montreal, Canada

TORONTO, COBALT, HALIFAX, WINNIPEG, ROSSLAND, VANCOUVER.

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The greatest advance in slime concentration attained in recent years has been accomplished by this table. Its success is emphasized by the fact that as the result of an elaborate competitive test with vanners of various makes **70 of these Tables are now in operation in the new mill of the Goldfield Consolidated Mines Co., Goldfield, Nevada**

This should draw the attention of all mill men. Send for Nos. 1, 2, and 3 Catalogues.

**Emil Deister, - - Fort Wayne, Indiana**

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HEAD OFFICE - - - - - TORONTO

ESTABLISHED, 1867

B. E. WALKER, President A. LAIRD, General Manager

PAID-UP CAPITAL \$10,000,000 REST \$6,000,000

### TRAVELLERS' CHEQUES

The new Travellers' Cheques recently issued by this Bank are a most convenient form in which to carry money when travelling. They are issued in denominations of

**\$10, \$20, \$50, \$100 and \$200**

and the exact amount payable in **Austria, Belgium, Denmark, France, Germany, Great Britain, Holland, Italy, Norway, Russia, Sweden and Switzerland** is stated on the face of each cheque, while in other countries they are payable at current rates.

The cheques and all information regarding them may be obtained at every office of the Bank.

Branches at **Cobalt, Elk Lake, Cowganda, and Latchford** in the silver mining camp of New Ontario and throughout Canada; also in the United States and England.

## The Canadian Laboratories

Chemical and Physical tests  
of all Materials.

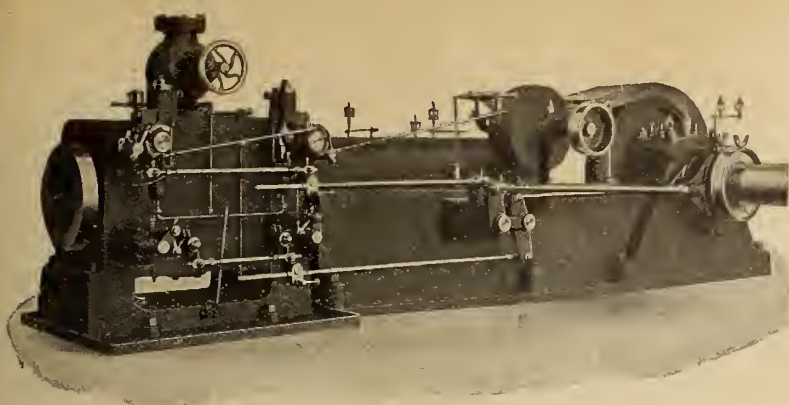
Mining properties examined  
and reported upon.

Write for prices for  
Ore analysis.

**37 Melinda St. Toronto**

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## Goldie Corliss Steam Engines

are operating some of  
the largest and finest  
plants in Canada.

**THERE MUST BE A REASON**

They are giving satisfaction to all users, and are designed to give the highest possible efficiency, for direct connection, belted or rope drive.

**THE GOLDIE & McCULLOCH CO., LIMITED**  
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WESTERN BRANCH  
248 McDermott Ave., Winnipeg, Man.

QUEBEC AGENTS  
Ross & Greig, Montreal, Que.

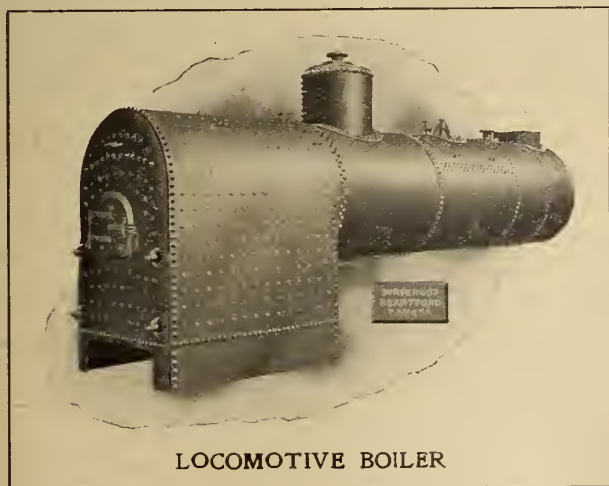
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**WE MAKE** Wheelock Engines, Corliss Engines, Ideal Engines, Piston Valve Saw Mill Engines, Boilers, Heaters, Tanks, Steam and Power Pumps, Condensers, Flour Mill Machinery, Oatmeal Mill Machinery, Wood-Working Machinery, Transmission and Elevating Machinery, Safes, Vaults and Vault Doors.

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## Locomotive and Stationary Tubular Boilers

IN STOCK—FOR IMMEDIATE SHIPMENT



LOCOMOTIVE BOILER

Inquiries Solicited.

## LOCOMOTIVE 30—40—50—60 H. P. TUBULAR BOILERS

8 72 x 18

4 66 x 16

2 60 x 14

3 48 x 14

For B. C. and Ontario.

**SHEET IRON and TANK WORK, BURNERS,  
HEATERS, ROCK CRUSHERS, ENGINES.**

**THE WATEROUS ENGINE WORKS CO., LTD.**

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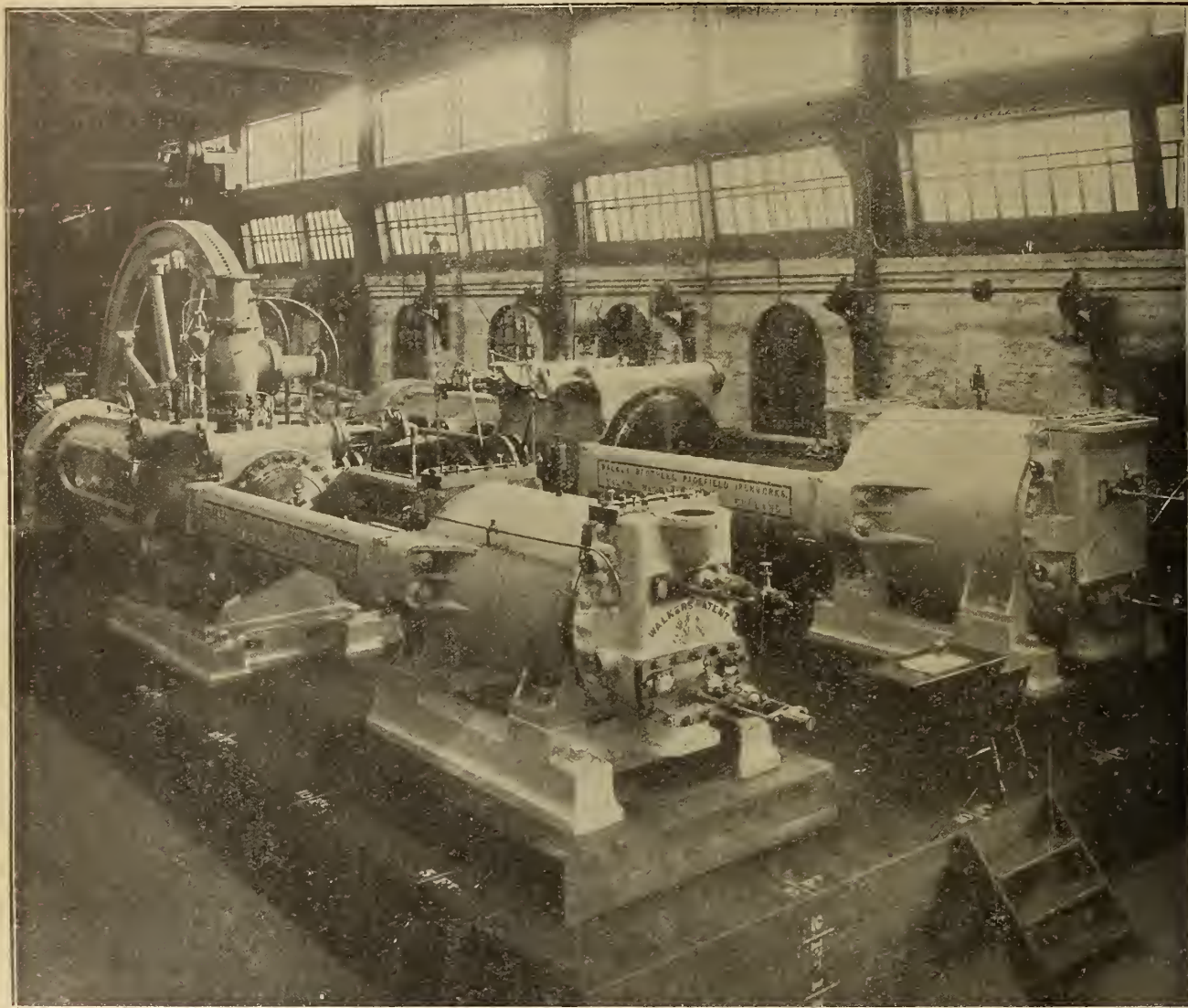
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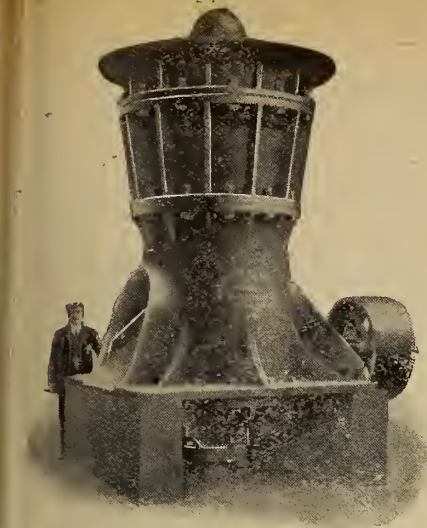
is used for all the wearing parts. This steel is the supreme material for  
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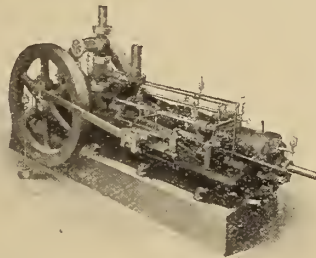
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AIR Compressors



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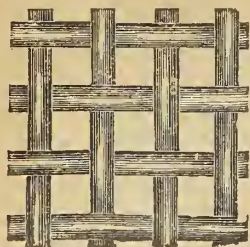
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**Compound and Triple Expansion**

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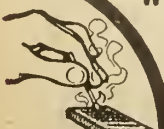

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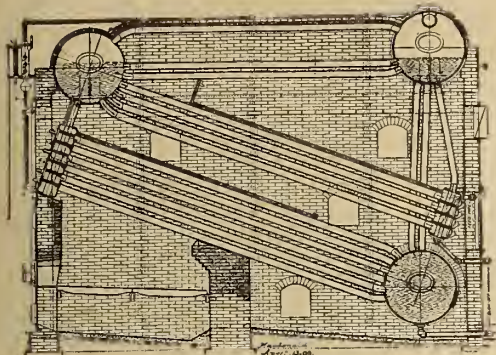
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Free expansion of tubes. Perfect water circulation. Dry or superheated steam. Half the usual number of handholes.

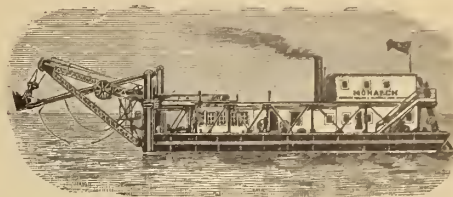
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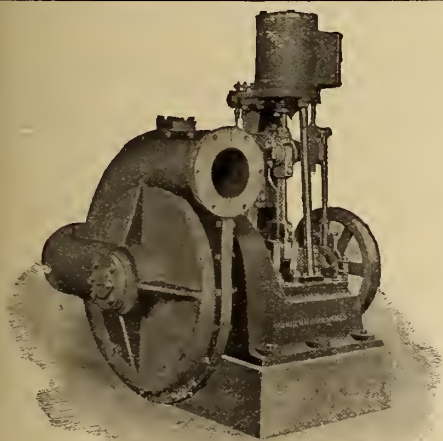
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Structural METAL WORK of all kinds**

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**Centrifugal Pumping Machinery for various Industrial Purposes**

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Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

The **FLORY CABLEWAY SYSTEM** is Superior to any on the Market

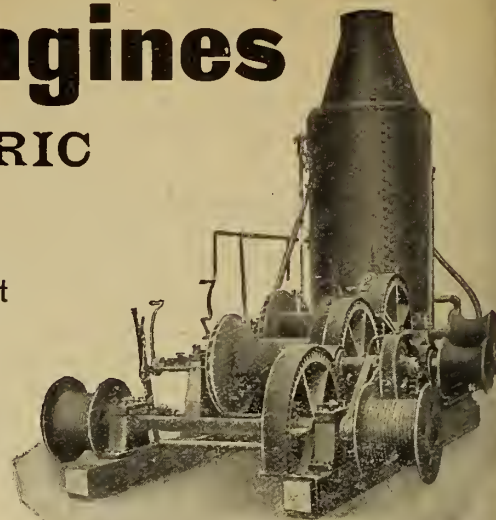
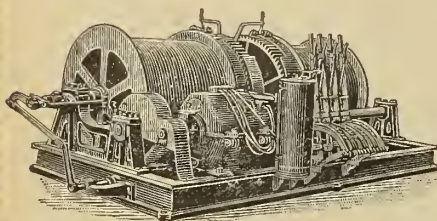
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All equipment is built in the Angus Shops at Montreal from the most modern designs, embodying every improvement known to practical railroading.

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## Absolutely Dustless The Behrend System

The Behrend Dry Concentrator is a portable and very durable machine, requiring only  $\frac{1}{2}$  horse power to operate. Capacity 8 to 15 tons per day, according to sizes of material under treatment, averaging about 12 tons.

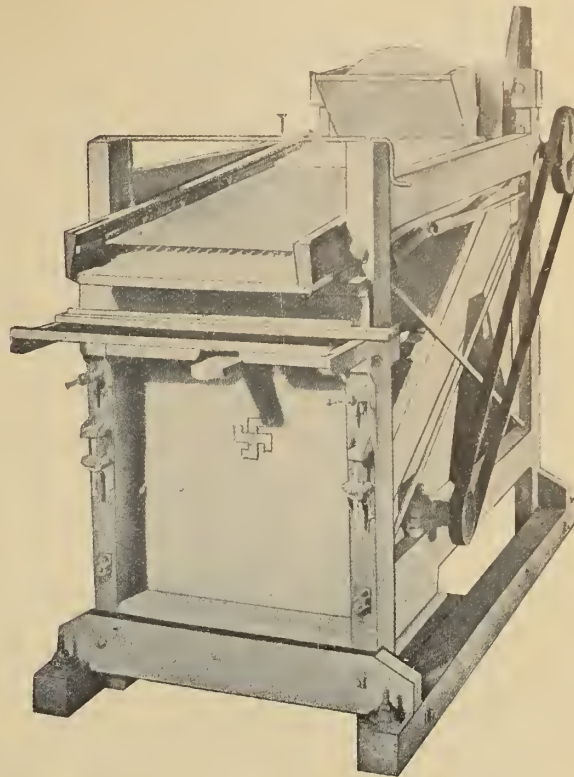
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Makes clean separation of zinc and lead sulphides. Works equally well on ores of all sizes from 8 to 100 mesh, and saves the slimes.

Unrivalled as a clean-up machine in placer work, recovering the black sand, gold and platinum.

The usual dust conditions peculiar to dry concentration are entirely eliminated.

Write us for descriptive pamphlet. Forward sample of your ore for preliminary test.



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All steel with frame of Koppel special wide flange channel. Capacity 18 to 27 cu. ft. Gauges 18 to 24 in.

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DESCRIPTION**

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Dept. Q.

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'Runs Easily, Works Well, Has Great Capacity.'

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Equipping as we have in this age of improved and automatic machinery, our equipment includes many special machines, tools, and instruments not to be found in any similar factory in the world.

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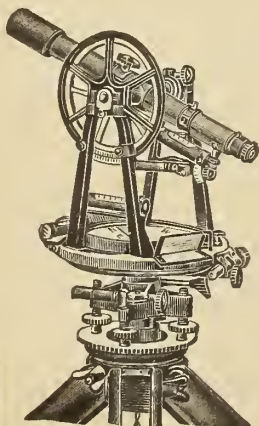
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380 St. Paul St., Montreal.  
B. C. Assay & Chemical Supply Company, Vancouver, B.C.

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The Secretary's Office and Library of the Institute have been removed to rooms 3 & 4, Windsor Hotel, Montreal, Que. Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a. m., to 1.30 p. m. and 2.30 p. m. to 6.00 p. m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

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Standard Instruments and Appliances for  
Mining, Subway, Sewer and  
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Yearly Output 3,500,000 Tons

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**BUNKER COAL**

Special facilities for quick bunkering of  
Ocean Steamers at Sydney and Louisburg.

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**Springhill Coal****The Cumberland Railway & Coal Co.**

Are prepared to deliver this well known  
Steam Coal at all points on the lines of  
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Coke for Blast Furnaces, Foundries, Manufacturing  
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RELIABLE, UNIFORM and STRICTLY HIGH GRADE

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D. FORBES ANGUS,  
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Also ask for our complete catalogue of Chicago **"GIANT"** Tripod and **"ONE MAN"** Rock Drills for quarry and mining operations. They are great time and money savers.

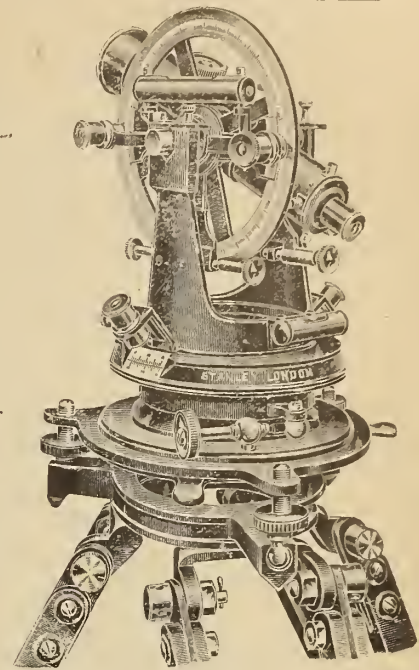
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Drawing  
Instruments  
in the World.



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and compare our  
prices with those of  
other first-class  
makers.

Stanley Underground Theodolite for Tunnelling has a hollow Axis so as to read nadir at 10 degrees through the Stand.

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MANUFACTURED BY

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CAMBORNE, CORNWALL, Limited  
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VICTORIA, B.C.

AND AGENCIES THROUGHOUT THE  
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RIGHT OF WAY MINE, COBALT, SHOWING BUILDINGS ROOFED AND SIDED WITH OUR ACORN QUALITY CORRUGATED GALVANIZED SHEETS.

## Acorn Quality Corrugated Galvanized Sheets

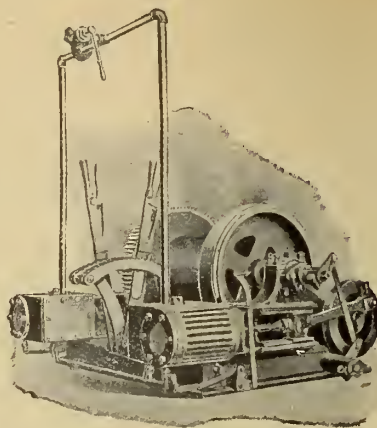
Satisfy every requirement for mining construction work. They are fireproof, durable and economical. Buildings may be erected more quickly by using our Corrugated Sheets than by any other style of construction.

Our ACORN QUALITY Corrugated Galvanized Sheets will stand the **British Government Acid Test** for Admiralty and other public service. This guarantees lasting service in the most trying conditions, and that is what mining men want.

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**METAL SHINGLE & SIDING CO. LTD.**  
**PRESTON & MONTREAL**





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Our Mining Hoists are built in a wide range of sizes.  
Single or Double Drum pattern, with or without reversing motion.  
The Levers are grouped in a Quadrant and the design throughout is of the best.

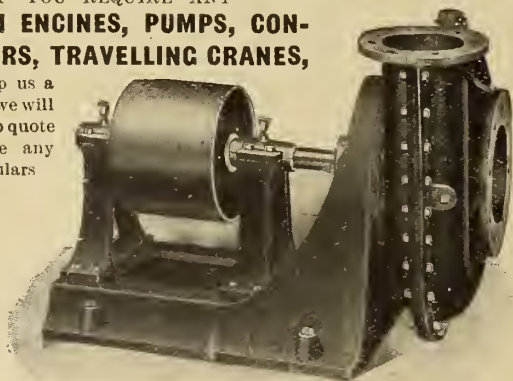
# The Jenckes Machine Co., Limited

SHERBROOKE, ST. CATHARINES, COBALT, VANCOUVER, HALIFAX

Works: Sherbrooke, Que., St. Catharines, Ont.

IF YOU REQUIRE ANY  
**STEAM ENGINES, PUMPS, CONDENSERS, TRAVELLING CRANES,**

etc., drop us a line and we will be glad to quote and give any particulars



The Smart-Turner Machine Co., Ltd., Hamilton, Ont.

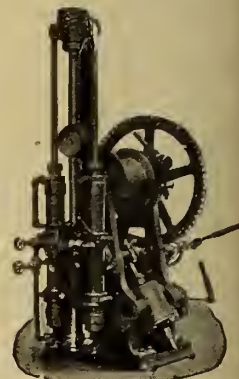
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Machines of all capacities for  
Prospecting Mineral Veins,  
ETC.

Take out a solid core

**AMERICAN DIAMOND ROCK  
DRILL COMPANY**

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Burns oil (flash point over 250°F).  
Electrically ignited. Platinum  
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Lamp Cleaning Machines  
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Section showing  
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Manufacturers of

**Instruments of Precision,  
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tical. Drawing Materials.**

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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, March 15, 1909

No. 6

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

**MINES PUBLISHING CO., LIMITED**

Head Office - Confederation Life Building, Toronto.

Branch Offices Montreal, Halifax, Victoria, and London, Eng.

Editor:

J. C. MURRAY, B.A., B.Sc.

**SUBSCRIPTIONS**—Payable in advance, \$2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, \$3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

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### THE CANADIAN MINING INSTITUTE.

The large registration of members attending the Eleventh Annual Meeting of the Canadian Mining Institute, held at Montreal on March 3, 4, and 5, may be taken as evidence of the lively interest that is evoked by that fixture. Most satisfactory also was the evident attention with which the reading and discussion of papers were followed. Moreover, the three days of convention proved all too short, and many highly valuable papers had to be omitted from the programme.

On another page there appears an account of the proceedings. It is our intention here to consider briefly a few matters bearing upon the work of the Institute.

In one respect the meeting that has just been concluded was an improvement on all preceding conventions. We refer to the fact that the proceedings were much facilitated by the presentation of papers in synoptical form. This saved time and made fuller discussion possible. Undoubtedly steps can still be taken in this direction. For instance, an inflexible time limit could be fixed for the presentation of any paper. Subjects foreign to the matter in hand should be rigidly excluded. The diversity of interests represented by the membership of the Institute appears to demand some such regulation.

The custom of attaching consecutively numbered badges to all delegates has much to recommend it. An arrangement of this kind would obviate confusion and would provide an easy means of distinguishing members from non-members.

In making these and other suggestions we do not by any means intend to imply that the last meeting was not well managed. The opposite is the case. But so rapidly is the Institute expanding that it will soon become unwieldy unless all arrangements are systematized.

By far the most important result of the Institute's deliberations was the unanimous decision to urge upon the Federal and Provincial Governments the pressing need of a Royal Commission to take up the work of simplifying and co-ordinating existing mining legislation. It was pointed out that the Federal mining law is nebulous and irregular, both in respect to its text and its administration. Moreover, all the Provinces would gain prestige, commercially and politically, if the present provincial Acts were reduced to a common basis. Work of this nature requires the continuous attention of a select body of men for not months, but years. But, as one speaker pointed out, half a million dollars spent thus would be a mere bagatelle when compared with the enormous benefits that would accrue to the mining industry, and, through it, to the common-

wealth generally. We shall have occasion to take up this subject again; but we wish to impress upon our readers and particularly upon all members of the Canadian Mining Institute, the vital need there is for the creation of this Royal Commission. Canada as a mining country has reached the parting of the ways. The mining industry should rapidly assume splendid proportions. Its progress is admittedly impeded by imperfect laws. These can be changed for the better at a cost not exceeding half of one per cent. of the wealth that is annually brought to Canadians by the industry. And the improvements that a Royal Commission could make in one or two years would, without question, cause an immediate increase in our yearly mineral output. Indeed no other course could do so much to stimulate all branches of mining. We venture the statement that the Canadian Mining Institute could not do better than to devote its whole energies to promoting this movement.

During the business sessions there was much talk of committees. Our own experience has led us to believe that committees are broken reeds. Much of the work that is assigned to them devolves upon one or two devoted persons. Canadian Mining Institute Committees are usually composed of men residing in widely separated localities. If there are to be committees then, despite all fear of sectionalism, they should be made up of persons resident in one district. But we believe also that the Secretary is competent to undertake, with the advice and encouragement of the Council, nearly all of the work now delegated to committees.

Another recommendation. It is imperative that the Secretary should visit annually every branch of the Institute. And provision should be made for this even at the risk of appropriating less money for publications. Not only will this tend to keep alive the Institute as a whole, but it will give the Secretary himself an insight into the needs and grievances of each branch.

We believe that the hints given above express opinions generally held by members of the Institute. In any case they are given solely with the desire to aid and strengthen our only national body of mining men.

And now a word of appreciation. The Montreal convention was unquestionably a success. President Miller expressed himself during one of the sessions as being highly gratified at the close attention given by the large number of members in attendance. He also spoke highly of the work of the Secretary, Mr. H. Mortimer-Lamb. For obvious reasons Dr. Miller could not refer to the manner in which the Presidential chair had been filled. But it may not be out of place to state here our opinion that the Institute was most fortunate in its choice of President. Dr. Miller has performed his duties with dignity and effectiveness.

The year 1908 was signalized by the largest and most successful summer excursion ever planned by a

technical society. We hope that the year 1909 will not be less fruitful.

Meanwhile, the Canadian Mining Journal congratulates the President, the Secretary, and the Council upon the strong position into which their combined efforts have brought the society.

### DISCOVERY AND ASSESSMENT.

Whatever divergence of opinion there may be as to the practical utility of inspection of mineral claims for discovery, there can be no question that a law that makes discovery of valuable mineral a prerequisite to securing mining territory encourages false swearing and a host of concomitant evils. Broadly speaking, the value of a mineral discovery is determined only by intelligent development. The actual value of a mineral deposit is determinable in no other way. Hence it may not be exceeding the bounds of moderation to characterize any attempt at an official declaration of the worth or worthlessness of a discovery as being arbitrary, useless, and, almost always, mischievous.

Experience in mining countries other than Canada has shown that rigid enforcement of discovery requirements is impossible. The most competent observers declare that legislation of this kind is either evaded or disregarded. Its literal application, were such a thing possible, would kill prospecting.

On the other hand, it is almost universally admitted that mining rights should carry with them specific obligations. These obligations may assume the form of rentals or of assessment work or both. Effective laws, effectively administered, perhaps need no more complicated basis than is thus provided. The proper expenditure of money and energy on mining prospects is to be encouraged.

Discovery is not enforceable. We know that its enforcement is largely a matter of discretion on the part of officials.

But when assessment work is neglected and its performance is falsely sworn to, the duty of an administration is clear.

Gowganda and its environs have been staked and re-staked by prospectors this winter. There are many actual cases where assessment work could not have been performed. There is no doubt that scores of men have, nevertheless, taken their affidavits as required by law, and have sworn that they had done the necessary amount of work, when they had done nothing more than place their stakes.

To this condition, we earnestly believe, the Ontario Government cannot remain indifferent. We submit, respectfully but none the less urgently, that inspection of assessment is a crying need. Not every claim need be inspected. If one or two offenders were caught and treated with exemplary severity, the atmosphere would be cleared. Meanwhile the new districts must suffer whatever stigma is attached to the unscrupulous methods of perjurers.



### AGRICULTURE AND MINING.

Mr. Hiram Donkin, Deputy Minister of Mines for Nova Scotia has been advocating strongly the encouragement and rehabilitation of Nova Scotia's agricultural industries. Believing that mining and agriculture march hand in hand, especially in settled countries, Mr. Donkin is urging the coal-mine operators of his Province to do everything in their power to stimulate their employees to cultivate the land.

Already in South Africa organized attempts are being made in the direction of providing a farming population for the Rand. The South African Mining Journal referred recently to "the extraordinary interest displayed by the whole community in the work of the Witwatersrand Agricultural Society, and of the South African National Union." Our contemporary also announced its belief that there has been a complete awakening to the necessity of revolutionizing the agricultural methods of the Rand.

There are many large areas in all the mining provinces of the Dominion of Canada wherein both mining and farming can be carried on profitably together to the material benefit of both of these essential industries. We have cited Nova Scotia. But there are also almost limitless tracts throughout New Brunswick, Quebec, Northern Ontario, Alberta, Saskatchewan, and British Columbia, where growing mining camps await the development that can come only with the advent of the farmer. Cultivation of the land will lower the cost of living for all classes, and from the farm the ranks of skilled labour will be recruited with able-bodied Canadians.

### ADVERTISING.

Mr. R. R. Gamey is a prominent member of the Legislative Assembly of Ontario. He is a staunch Conservative. His rise to prominence was spectacular. Formerly he was a bit of a swashbuckler. Latterly he has developed qualities that indicate larger possibilities in the political arena.

But Mr. R. R. Gamey transgresses the rules of decent business and the laws of good taste when he uses his position as a member of the Legislature to give colour to his mining advertisement. Mr. Gamey may or may not be a good adviser as to mining speculation. If he is well qualified he does not need to use his M.P.P. as a lure. If he is not a safe guide, then his

title is distinctly a source of danger. In any case he was elected not to sell mining stocks, but to serve the interests of his constituents.

If, therefore, Mr. Gamey wishes to be remembered by posterity as anything more than a huckster of dubious scrip, he will do well to respect the distinction that must exist between R. R. Gamey, the ambitious politician, and R. R. Gamey, the broker and promoter. Meanwhile, caveat emptor!

### EDITORIAL NOTES.

The recently elected president of the American Institute of Mining Engineers, Mr. D. W. Brunton, is a native of Canada. Mr. Brunton is a consulting mining engineer, practising in Denver. His invention, the Brunton mechanical sampler, became the basis of a large system of public sampling works in Colorado, Utah, and Nevada.

The Financial Times (London) predicts that serious difficulties will arise when, on July 1st of this year, the Eight Hours Bill comes into force. Our contemporary's remarks are applied to the coal owners and miners of South Wales. The question of increased pay for miners working in "abnormal places" will, it is thought, become one of the most prominent causes of dispute.

The catholicity of the mining profession has been illustrated by many such cases as the election of Mr. Brunton. Dr. James Douglas, past president of the American Institute, is a Canadian. Mr. W. A. Carlyle, whose appointment to an important technical chair in London was noted lately, is a Canadian. To these names we might easily add those of a score of prominent Canadian engineers employed in foreign countries.

For some years the Ontario Government has attempted to provide practical instruction for prospectors and miners. This has been done by means of holding technical classes at various mining camps during the summer season. The Transvaal University College has followed Ontario's example. A course of lectures to miners is to be inaugurated at various local centres along the reef. Instruction will be given in subjects pertaining to mining and mining economics.

## ELEVENTH ANNUAL MEETING OF THE CANADIAN MINING INSTITUTE.

Montreal, March 3, 4, and 5, 1909.

Early on Wednesday morning, March 3rd, in the rotunda of the Windsor Hotel, Montreal, mining men from east and west and north exchanged their annual greetings. A particularly large contingent from Cobalt, Sudbury and adjoining districts was much in evi-

dence. Other parts of Ontario were well represented. Quebec's delegates were not less numerous than heretofore. British Columbia, Alberta and Nova Scotia were also represented.

At 10.30 a.m. proceedings were opened officially in



the Ladies' Ordinary. President W. G. Miller read the Presidential Address, the text of which is given below:—

### PRESIDENTIAL ADDRESS.

Gentlemen,—The Canadian Mining Institute, founded in 1898, has entered on its second decade. The questions may then be asked, what has the Institute accomplished, what progress has been made in the mineral industry during the last ten years, and what is the outlook for the future?

We have first to consider the work of the Institute itself. At the annual meeting in 1898 we had a membership of 63. At the present time our membership is about 850, including student members, and it is growing rapidly. We shall soon have 1,000. The Institute has covered a wide field. Its most important work, probably, has been that of the publication of papers. Our last annual volume consists of over 600 pages. Few of these papers would have been written had the Institute not existed. Mining men are proverbially reluctant to appear in print, and their valuable experience is frequently lost. Local branches have much to do with getting papers. Men will prepare papers under local encouragement when they would pay little attention to written communications from the Secretary. Moreover, the student membership has had a beneficial influence in encouraging the budding members to write for our transactions.

When arrangements are completed for the establishment of libraries in connection with the branches, the work of the Institute will be broadened still further.

During the ten years of its existence the Institute has been called upon to give advice on legislation and on other matters concerning the mineral industry. Much more has been accomplished in this connection by the Institute than could have been achieved through other channels.

Several excursions to mining centres have been held, which have done much to make Canada's mineral resources known. Among these excursions may be mentioned that to British Columbia in 1899, that to Quebec Province and to Nova Scotia, in company with the American Institute of Mining Engineers, in 1900, that to Cobalt in 1907, and lastly that of 1908, from the Atlantic to the Pacific. This excursion was a greater success than the most sanguine of our Council or members could have expected it to be. The character of the guests of the Institute from Great Britain and abroad insured success.

The work of arranging for the excursion and carrying it to a success fell chiefly on our Secretary, Mr. Mortimer-Lamb, and on our Treasurer, Mr. Stevenson Brown. While their fellow-members of Council have expressed to these two gentlemen their pleasure at the success achieved by the excursion, this annual gathering seems to me a suitable place to thank our Secretary and our Treasurer, on behalf of the membership at large, for the care which they gave to the arrangements for the excursion. The Secretary is also to be congratulated on the bulletin which he has published, recording the events of the trip.

At the last annual meeting both the Secretary and the Treasurer told me they intended to work with the object of making the past year the most successful in the history of the Institute. We have to thank them for the efforts which they have made, and for the success which they have achieved.

Mr. Stevenson Brown, having served as Treasurer of the Institute for the past ten years, is now retiring from that office. I can assure him that he has the best wishes of the members of the Institute, and we hope that his association with the Institute as its Treasurer will be a pleasant memory. When he recalls the early days of the Institute and the progress during later years, and when he watches the development in the future, it is to be hoped that Mr. Brown will find some recompense for the ten years in which he has served as an executive officer.

Our Secretary, in the Excursion Bulletin, has referred to many men in various parts of Canada to whom thanks are due for the success of the trip. On behalf of the members generally, I wish to again tender thanks to all. Time will not permit of my referring to individuals or organizations, but I wish to express thanks to another official of the Institute for the care with which the arrangements in the West were looked after. I refer to Mr. E. Jacobs, the Secretary of the Western Branch, who did much towards making the trip through British Columbia so successful.

I have briefly described the work done by the Institute, but greater than all else are the opportunities which are given the mining men of Canada, from one end of the country to the other, of getting acquainted with one another. These annual meetings would be very valuable even if no papers were read. Men get acquainted, compare notes and form friendships which they would have no other opportunity of doing. All this has a broadening effect; and I am sure that every one of us after an annual meeting goes back to his work better equipped to carry it on.

In the year 1898, when the Institute was organized, Canada's annual mineral output was valued at \$38,412,431. In 1908 the value reached \$87,323,000. This increase is highly satisfactory, and offers encouragement for the future. We may truthfully say, without being accused of boasting, that no country gives greater hope for the future in mining than our own.

For years past there has been no doubt that the territory bordering on the Atlantic, with its great coal deposits and other mineral resources, has a bright future as a mining country. Similarly, every one has agreed that the part of our country bordering on the Pacific Ocean is destined to become great as a mineral producer. Mountains with the same characteristics extend from old Mexico and the United States through British Columbia and the Yukon. It has been estimated that the metal output of Mexico and the United States in the mountainous tracts adjacent to the Pacific has amounted to over \$3,500,000 for each mile in length of these mountainous tracts. The Canadian territory to the north has then great promise. While, therefore, all will admit that the Canadian territories on the Atlantic and those on the Pacific are destined to become centres of a great mineral industry, what is to be said of that vast Canadian region which lies west of the Acadian Provinces and to the east of the Rocky Mountains?

In the past the people of Quebec and Ontario have heard little of their resources other than those of the forest and the soil. It has been difficult, as most of us know, to arouse much interest in the mineral possibilities of these two provinces.

One-half of the 3,750,000 square miles of Canada, chiefly in the provinces of Quebec and Ontario and in the territories to the north and northwest, is underlain by rocks of pre-Cambrian age. The mining experience of Canada has been drawn, naturally, largely from the



United States, where the pre-Cambrian rocks cover a small extent of territory. It is but to be expected then, especially as the great part of the pre-Cambrian region of Canada is accessible with difficulty, that it would, up to the present, have attracted little attention as a mineral field. If we consider, however, what the pre-Cambrian region has already done, it seems to me we should feel that these vast areas of the old rocks give great promise. Personally, I feel no doubt about it. These pre-Cambrian regions are destined to be the scenes of great mineral development.

A small point of these old rocks extends from the north into the States of Minnesota, Michigan, and Wisconsin. It is this pre-Cambrian area that has caused the United States to become the world's greatest producer of iron and steel, and the copper mines of Michigan have long been famous.

The pre-Cambrian country over much of its surface offers little inducement to the agriculturalist, although it possesses some fertile areas. Settlement has for this reason made little advance into the north, but along the thin line of settlement in Ontario we have, in the pre-Cambrian, the world's greatest producer of nickel, Sudbury, and the silver camp, Cobalt.

Areas underlain by rocks similar to those in the iron and copper fields of Michigan and in the iron ranges of Minnesota, and to those of Sudbury and Cobalt, are known to occur at numerous points over the 1,800,000 square miles of the Canadian pre-Cambrian regions. It does not require the vision of a prophet to foretell what will be the mineral development when our pre-Cambrian regions are adequately explored and prospected. The mining men of Canada, and their society, the Canadian Mining Institute, have a great mineral field before them—half a continent. We are scarcely at the beginning. Let us make the best use of our opportunities. Let us avail ourselves of the experience of older mining countries, have faith in Canada and in ourselves, and a firm belief in the future of our industry.

In conclusion, I wish to thank the members of Council and the membership at large for the pleasant year I have had in the Presidency of the Institute. My labors have been made light by the kind co-operation and assistance which I have received on every hand.

I now have pleasure in declaring the Eleventh Annual Meeting of the Institute open for the reading of papers, the transaction of business, and especially for social interviews and the interchange of good-fellowship.

The annual report of the Council was then read by the secretary, Mr. H. Mortimer-Lamb. The retiring treasurer, Mr. J. Stevenson Brown, presented his statement and balance sheet, and the report of election of council was announced.

After general business discussion, Mr. J. McLeish, statistician of the Department of Mines, Ottawa, read a preliminary statement of the mineral production of the Dominion for 1908. Similar statements were read for Quebec by Mr. J. Obalski, and for Ontario by Dr. W. G. Miller, representing Mr. T. W. Gibson, Deputy Minister of Mines. All three statements appear on other pages of this issue of the Canadian Mining Journal.

During the afternoon session Mr. G. R. Mickle, Assessor of Mines for Ontario, read a most important paper on "The Probable Effect of an Acreage Tax on Mining Lands in Ontario." Mr. Mickle traced the

history of mineral land taxation in Ontario, the changes in units of area, the development and effect of the acreage tax, and the present condition of the several mining divisions of the province. Copies of a blueprint map were distributed to illustrate the paper. It was demonstrated that one effect of an acreage tax of two cents per acre has been the revision to the province of many thousands of acres of mining lands in 1910.

Mr. E. L. Fraleck, of Cobalt, Ont., followed Mr. Mickle. He spoke on "The Application of an acreage tax to the Mineral Areas of Central Canada." Mr. Fraleck urged the imposition of a much larger acreage tax than has heretofore obtained. A tax of from ten to twenty-five cents per acre would, he contended, throw open the large areas now held closely by speculators and others, and would undoubtedly facilitate legitimate exploitation and development.

Mr. Fraleck adduced illustrations from the laws of Mexico and of many sections of the United States. His matter and style were convincing. After a general discussion, in which Messrs. Coste, Barlow, Hay, A. H. Smith, Brock, Langford, and others took part, the meeting declared itself in favour of acreage tax that should be heavier than that at present imposed.

To deal with questions such as these and with the larger problems of mining legislation, such as the construction of practicable Federal laws, the simplification of the various provincial laws, and the co-ordination of all of these, it was unanimously decided that a permanent committee of the Council of the Institute be instructed to approach the Federal authorities and urge the immediate appointment of a Royal Commission. As to the need of this step there appeared to be entire unanimity.

Through the courtesy of the authorities of McGill University, the members of the Institute were their guests on Wednesday evening, at a lecture on "The Electric Furnace with Special Reference to the Electro-Metallurgy of Steel." The lecture was delivered by Dr. Alfred Stansfield in the Chemistry and Mining Building. After the lecture Dr. Stansfield gave practical demonstrations of the conversion of pig iron into steel in the induction furnace. The lecture was attended by a large number.

#### Thursday.

The Thursday morning session was one of the most instructive ever held by the Canadian Mining Institute. The first paper read was that of Mr. S. F. Emmons, of the U. S. Geological Survey. Mr. Emmons is the senior officer of the U. S. Survey. He has studied for almost 40 years the principles of ore deposition as applied to American occurrences. His address was an outline of the rise and fall and development of various theories of the formation of ore deposits. He noted the predominance in late years of the view that ore deposits are largely and generally connected with igneous or volcanic action. He showed that the work of the U. S. Survey had been of supreme value to the mining industry of that country. Since Canada is a vast and sparsely settled country, Mr. Emmons urged that the labours of our own Survey be intensive over small and important mining areas, rather than extensive over wide and doubtful territories.

Mr. Waldimar Lindgren, whose name needs no introduction to Canadian readers, spoke next. His subject was "Metallogenetic Epochs." Briefly, his theme was a comprehensive review of the successive eras in the world's geologic history which have been characterized by the deposition of distinctly different metals



and ores. In a later issue of the Canadian Mining Journal we shall deal with Mr. Lindgren's paper more fully. Meanwhile it is sufficient to state that it was one of the outstanding features of the convention. Prof. J. F. Kemp opened the discussion of both of these papers. He was followed by Mr. J. B. Tyrrell, Dr. Frank D. Adams, Prof. M. B. Baker and others.

The closing feature of the morning session was an illustrated paper read by Dr. A. C. Lane, State Geologist, Michigan, U.S., on "The Mine Waters of Michigan." The importance of a knowledge of the chemical constituents of mine waters and the bearing of that knowledge on the operations of pumping, sinking, and developing, were well brought out by Dr. Lane.

Thursday afternoon was devoted to a business session. The proposed amendments to the by-laws were rejected by large majorities. It was decided to refer amendments to a committee of the Council. The discussion rose nearly to boiling point once or twice. In general the meeting appeared to be opposed to any radical alteration of the present by-laws—at least to alterations that do not make for simplicity and efficiency.

As there was a short time to spare at the end of the business session, the President requested Mr. E. T. Corkill to read his paper on "Mine Accidents."

#### Thursday Evening.

The smoker has become part and parcel of the Institute's proceedings. The capacious Ladies' Ordinary was filled to the doors when, at 8.30 p.m., Chairman G. G. S. Lindsey called the meeting to order, "order" in this connection meaning simply less chaos. The evening was enlivened by a diversity of amusements. The organ notes of Mr. N. MacDonald punctuated every minute. Hereafter a MacDonald obligato will be demanded by dozens of Mr. MacDonald's admirers, new and old.

Perhaps the most instructive item on the programme was Dr. Kemp's magnificent and luminous illustrated lecture on the origin of ore deposits. By what means Dr. Kemp had secured his marvellous slides we stay not to enquire. Politeness forbids. But we feel deeply the honour at having been present at this revelation of scientific acumen and enterprise. Dr. Kemp, in that passionless, calm, dignified style that marks the true geologist, threw picture after picture on the wall to illustrate his theory of ore deposition. The volcano, a sight that congealed one's blood, was followed by the fissure; the fissure by the hot spring; the hot spring by the deposition of a huge quartz vein, and so on until the last link, the modern cyanide plant, was projected visibly upon the white canvas. So lurid was the whole presentment that strong men sobbed, and the speaker himself could scarcely suppress his emotions.

A programme of songs and anthems and specialties provided a cheerful evening for the two hundred and fifty guests present.

#### FRIDAY.

The Friday morning session commenced with the reading of a paper by Dr. J. F. Kemp, of Columbia University. Dr. Kemp discussed at length the question, "What is an Ore?" Mr. Waldimar Lindgren and Dr. J. W. Woodman contributed to the discussion. One definition that appeared to meet with general approval reads thus: "An ore is a mineral aggregate containing enough metal to be extracted at a profit." The discussion was animated.

Dr. Adams then made a few remarks about an occurrence of ore at the City of Cobalt Mine, Cobalt, Ont., and Mr. J. C. Murray presented a paper by Mr. F. W. Gray on "Oxygen Breathing Apparatus in Coal Mines."

The afternoon session was taken up with continued reading of papers. Mr. D. B. Dowling's "Probable Chemical Changes in the Formation of a Coal Bed" was followed by Mr. Eugene Coste's on "The Origin and History of Coal and Petroleum." Director R. W. Brock then read "The Need of Recording Occurrences of Economic Deposits," and Prof. John A. Dresser presented a synopsis of a most interesting and carefully prepared paper entitled "The Mineral Resources of the Serpentine Belt, Quebec."

The session was thus brought to a close, and there remained only the annual dinner.

#### Annual Dinner.

Rarely has there been such a gathering as sat down to dine in the Ladies' Ordinary of the Windsor Hotel on the evening of March 5, 1909. The Governor-General, Earl Grey, had signified his intention to be present. The Hon. Mr. Templeman, Minister of Mines for Canada; the Hon. Mr. Cochrane, Minister for Ontario; Mr. J. Obalski, representing the Quebec department, and many other distinguished guests and representatives sat at the head table, where President Miller, with Earl Grey on his right, and Mr. Templeman on his left, occupied the seat of honour.

After duly honouring the toast of "The King," President Miller proposed that of "His Excellency the Governor-General," which was received with tremendous enthusiasm. His Excellency, in responding, referred in terms of high appreciation to the work of the Institute. In tracing the progress of mining education he touched upon the labours of the late Principal Grant, of Queen's University, through whose enthusiasm the School Mining of Kingston was brought into being, the first institution of its kind in Canada. Glancing over the progress of Canada's mining industry, His Excellency predicted that within a short period our mineral output will be doubled.

Other speakers were the Hon. Mr. Templeman, the Hon. Frank Cochrane, Mr. Goodeve, M.P., Mr. G. G. S. Lindsey, Mr. Obalski, Dr. J. F. Kemp, Dr. A. C. Lane, Dr. J. W. Woodman, Mr. J. E. Hardman, Mr. E. L. Fraleek and Mr. F. W. Guernsey. The dinner was continued informally for some time after the distinguished guests had departed.

#### THE MINING SOCIETY OF NOVA SCOTIA.

##### Seventeenth Annual Meeting.

The seventeenth annual meeting of the Mining Society of Nova Scotia was held on March 3 and 4, at the rooms of the society, Hollis Street, Halifax, N.S.

On the afternoon of Wednesday, March 3rd, proceedings commenced with the reading of a paper by the Hon. Robert Drummond. "The Mine and the Farm" was the subject-title. Citing European countries as examples, Mr. Drummond argued that with the development of the mining industries all the industries would follow. A paper submitted by Dr. R. W. Ells, of the Geological Survey of Canada, on the "Oil-shales of New Brunswick," was read by Mr. Hugh Fletcher. It described the results of tests conducted in Scotland on a forty-ton experimental shipment of New Brunswick



oil-shales. The announced results were most satisfactory.

Mr. F. H. Sexton, Director of Technical Education, then spoke of the purpose and benefits of last summer's visit of the European mining engineers.

The retiring president, Mr. C. J. Coll, read a paper describing a dam built in the Macgregor shaft, Stellarton, in fighting a fire. The paper was illustrated with several large diagrams.

The Hon. Mr. Drummond, in the course of his paper mentioned above, brought out some striking facts. In the four coal mining counties of Nova Scotia the sum of \$7,890,000 is distributed annually in wages. If supplies be included in this estimate, the total becomes \$10,003,000. The number of employees is 16,750, and 57,350 souls are numbered as dependent upon these employees. Altogether there are 125,000 dependent in large degree upon coal mining. In Cape Breton County, according to Mr. Drummond's estimate, the coal mining companies distribute \$100 in wages per annum per head of population. Including supplies this figure is increased to \$128.

On Wednesday evening the seventeenth annual banquet was held at the Halifax Hotel. The gathering, while not as large as usual, was representative and enthusiastic. The toast list was short, as all toast lists should be. After the King's health had been drunk, the toast of "Canada" was responded to by Chief Justice Townsend, who, after alluding to mining as the chief industry of the country, expressed the hope that in future he would be given less to do officially with the miners of the province and that all would be peace and quietness.

To the toast of "The Provincial Government" Premier G. H. Murray responded. He spoke most warmly of the work done by the Mining Society of Nova Scotia, and by its secretary, Mr. A. A. Hayward.

The Hon. C. P. Chisholm spoke briefly to the toast of "Our Mines," as also did the Hon. W. T. Pipes. "Sister Societies" and "Our Guests" were the two concluding toasts. Throughout the dinner musical numbers and recitations varied the programme.

The menu card is one of the most effective that we have seen. A bronze-coloured print of Vaerenbergh's "The Miner" appears on the cover against a background of delicate blue. The menu is made up entirely of traditional geological dishes, some of which, we grieve to state, have room for grave complaint against the printer.

Announcement of the results of the annual elections was made on Thursday, March 4th. The following were declared elected:—

President—T. J. Brown.

Vice-President—F. H. Sexton.

Second Vice-President—G. J. Partington.

Secretary—A. A. Hayward.

Treasurer—H. M. Wylde.

Council—Hon. R. Drummond, Hon. B. F. Pearson, G. W. Stuart, C. C. Starr, J. R. Cowans, Alex. Dick, R. H. Brown, T. Cantley, A. L. MacCallum.

The session was brought to a close after the reading of a paper on tungsten occurrences in Nova Scotia, by Mr. A. L. MacCallum, and a discussion of Government aid to Nova Scotian gold mines. The discussion was led by Mr. A. A. Hayward.

## Mining Methods and Equipment at the British Columbia Copper Company's Mother Lode Mine.\*

By M. D. McIntosh, Superintendent at Mother Lode Mine.

The following is a brief description of the system of mining and equipment at the British Columbia Copper Company's Mother Lode Mine, Boundary District of British Columbia.

At this mine there is one distinct ore body, which already has been opened by four levels, work on a fifth having been only recently started. The ore body is a contact deposit between limestone on the foot-wall and greenstone on the hanging-wall; the dip being about 70 degrees to the east, and the strike northeast with a southerly pitch. Most of this ore has been formed by replacement and alteration in the greenstone, the limestone being as a rule but little affected.

Several dykes of porphyry, from one to twenty feet thick, intersect the ore at approximately right angles to the dip, and frequently prove troublesome in mining. East of the quarries the ore is covered with a flow of later, and barren, eruptive rock, which has limited the width of the quarries to about half that of the ore body.

The ground is very firm and stands well—a fact of the greatest importance in the operation of the mine, and without which it would be impossible to maintain in safety the large open spaces underground.

All four levels are connected by stopes and raises. On each level are parallel drifts from about 50 to 70 feet apart, connected by crosscuts and drifts run at

various angles, thus allowing ore trains to pass each other at different parts of the mine. The first drift is along the foot-wall of the ore body, the second in the centre, and the third close to the hanging-wall. By this method any number of trains may be conveniently handled on the level.

Chute raises are begun at intervals of 35 feet apart, every alternate chute being placed on the opposite side of the drift. By this arrangement the stopes on each level are easily connected, and the chutes also serve for ventilation purposes. The chutes are started in the same manner as a raise; after raising 8 or 10 feet a beginning is made to funnel them on all sides at an inclination of about 35 degrees. When several connect with one another the stope is extended, leaving pillars at convenient places. This preliminary work having been done, the stopes are carried to the next level above in a series of large spiral raises. After connecting the levels, tripods are used in the bottom of the stopes.

When any level is thoroughly connected with the next lower level by means of these spiral raises, the ground is then in such shape for caving that work can be started at the farthest point from the shaft and the

\*Paper read before the Canadian Mining Institute.

pillars between the spirals blasted doyn, allowing the ore to drop to the level below. In this way the level is kept safe while the work is progressing on the other levels.

The large quarries, of which there are six, are all connected with the 60-foot level, while in one place connections are made with the 200-foot level. This has been found a great advantage, as the ore, falling so far, is thereby broken much finer, effecting a great saving in powder for bulldozing and involving much less labor for the chutemen and skipmen in handling the ore.

The ore is conveyed to pockets at the shaft in cars drawn by horses. Two types of cars are used. On the lower levels the cars are 30-ton side-dumping; on the 60-foot level trains are loaded of three and four 3-ton scoop cars. An automatic dump unloads them at the pocket. A chuteman with a helper loads the ore from the chutes. In case a chute gets blocked he does the necessary blasting to clear it. The chute openings are 3x4 feet, and are built of heavy round timbers. The bottoms and sides are 4x10-inch timbers lined with 1/4-inch steel plate. The collar braces are covered in the same manner. Two descriptions of gates are used—one a circular iron chute gate, and the other the old style chute boards.

The shaft is vertical, with four compartments, each compartment being 4 1/2 x 5 feet. Two compartments are used exclusively for ore, one for lowering and hoisting the men, and the fourth for ladder and pipe way.

Connected with the shaft are large storage pockets at each level, from which the ore is hoisted by two skips, each holding four tons, these being loaded by means of finger gates operated by compressed air.

One 20x36 Jenckes hoisting engine is used. It is easily capable of hoisting the skips 400 feet per minute, or 60 skips per hour, from the 400-foot level (the deepest now opened), or at the rate of 240 tons per hour. The cage is operated by one independent 80 h.p. single drum hoist, and is counterbalanced by sliding weights run in the ladder compartment of the shaft.

There are two compressors, one a 16x25x26 D. 2. T. Rand engine, capacity 3,400 feet of free air per minute, and one Ingersoll-Sergeant machine of 2,800 feet capacity. The Rand is driven by a 600 h.p. Canadian General Electric motor, and the Ingersoll by a 500-h.p. Westinghouse motor.

The writer has devised what has proved to be a most satisfactory system for separating the moisture from the compressed air, consisting of a 100 h.p. boiler submerged in a tank of water. The air passing through the boiler is cooled and the moisture drawn off. After once being filled, only a small quantity of water is required to keep the tank cool.

There are two crushers, one a 36x42-inch jaw opening, and the other a 16x34 Farrel-Bacon machine. These are connected with a 100 h.p. motor and a 100 h.p. steam engine, so arranged that either can be driven by steam or electricity at will, which arrangement effectually guards against failure of crushing operations. After crushing the ore, it is conveyed to the shipping bins by means of a 10-ply rubber belt, 36 inches wide and 167 1/2 foot centres. The bins have a capacity of 2,000 tons, of which about half will run into the cars.

The hoisting engines are arranged so that they may be operated either by steam or compressed air. The steam is supplied by two 60 h.p. boilers. One is kept in constant use for general heating purposes. Ordinarily compressed air is used, and this is found to be considerably less costly than steam.

During the month of December the underground force at the Mother Lode consisted of 1 foreman, 4 shift bosses, 126 miners, 4 timbermen, 4 pipemen, 16 muckers, 16 chutemen and trammers; 1 trackman, 4 nippers, 4 skipmen, 2 cage-tenders, 1 powderman and 4 blasters—a total of 187. The total force employed at the mine, exclusive of boarding-house employees, was 235. The daily average output of ore was 1,545 tons. The daily average output per man was 6 1/2 tons for all men employed.

## MINE ACCOUNTING.

By John G. Grant, B.A., Chartered accountant, Toronto, Ont.

(Continued from last issue)

### III.

Men working in mines are paid according to the length of time worked or according to the amount of work accomplished. The first method is used for the men who are the company's own employees; the second for the men working under contract to the company.

In large companies a timekeeper is employed to take charge of the time books and pay sheets, but in small

concerns the storekeeper or foreman may do the work. Every morning the man whose duty it is makes a round of the works and enters up in the following form the men who are at work:—

The entries are then copied into another book called the "Time Book," with the same ruling, but with the addition of two columns, one for the rate per day and the other for the amount. In the "Time Book" the

| Time from |            | to   |     |      |     |      |     |     |
|-----------|------------|------|-----|------|-----|------|-----|-----|
| Name      | Occupation | Sund | Mon | Tues | Wed | Thur | Fri | Sat |
|           |            |      |     |      |     |      |     |     |
|           |            |      |     |      |     |      |     |     |
|           |            |      |     |      |     |      |     |     |
|           |            |      |     |      |     |      |     |     |
|           |            |      |     |      |     |      |     |     |
|           |            |      |     |      |     |      |     |     |
|           |            |      |     |      |     |      |     |     |
|           |            |      |     |      |     |      |     |     |
|           |            |      |     |      |     |      |     |     |

Columns continued so as to  
contain two weeks



men's names are grouped on the basis of their occupation, so that all the blacksmiths, for example, will be in the same group and similarly the carpenters, engineers, etc. This will give facility in making an analysis of the cost of each department. To find the cost in wages of any new work, and for the distribution of the charges for repairs, it is necessary for the foremen of the different classes of workmen to keep "Time

Sheets," on which each man enters what he is doing and the number of hours spent in the work. Although it is customary to keep account of this in a very rough-and-ready fashion, better results will be obtained by using a printed form, which, by giving more accurate results, may be used as a good check on the Time Book. The following is a simple form of a Time Sheet:—

|         | from to         |            |      |            |
|---------|-----------------|------------|------|------------|
|         | Name of Workmen | What doing | Time | Total Time |
| Monday  |                 |            |      |            |
| Tuesday |                 |            |      |            |
|         |                 |            |      |            |
|         |                 |            |      |            |

In general, the sinking of shafts, driving of levels, etc., are done by contract, a fixed price being paid per linear foot. In the case of shaft-sinking the rate per foot increases according to the depth attained. A book

ruled as follows should be kept for purposes of comparison with other work of the same character and as a check on the amount of work paid for:—

Contract Book

| Date | Name of Contract | Where Done | Conditions | Measurements | Paid for | Unpaid | Rate | Amount |
|------|------------------|------------|------------|--------------|----------|--------|------|--------|
|      |                  |            |            |              |          |        |      |        |
|      |                  |            |            |              |          |        |      |        |
|      |                  |            |            |              |          |        |      |        |
|      |                  |            |            |              |          |        |      |        |

At the end of each month an analysis of the wages is made, showing the average tonnage of ore raised per day and the average cost per ton in wages. This

analysis may be ruled up by the timekeeper himself on blank paper, as follows:—

Analysis of Wages

|                               | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|-------------------------------|-----|-----|-----|-----|-----|------|------|-----|------|-----|-----|-----|
| Total Days Worked Underground |     |     |     |     |     |      |      |     |      |     |     |     |
| Aboveground                   |     |     |     |     |     |      |      |     |      |     |     |     |
| at other work                 |     |     |     |     |     |      |      |     |      |     |     |     |
| Worked                        |     |     |     |     |     |      |      |     |      |     |     |     |
| Tons Raised                   |     |     |     |     |     |      |      |     |      |     |     |     |
| Average Tonnage per Day       |     |     |     |     |     |      |      |     |      |     |     |     |
| Total Wages Underground       |     |     |     |     |     |      |      |     |      |     |     |     |
| Aboveground                   |     |     |     |     |     |      |      |     |      |     |     |     |
| on other work                 |     |     |     |     |     |      |      |     |      |     |     |     |
| Paid                          |     |     |     |     |     |      |      |     |      |     |     |     |
| Tons Raised                   |     |     |     |     |     |      |      |     |      |     |     |     |
| Average Wage Cost per Ton     |     |     |     |     |     |      |      |     |      |     |     |     |

It will be noticed that columns are left for the 12 months, by which a convenient comparison is shown between the costs per ton raised for the different months. In the "total wages for other work" the contract work on shaft-sinking may be included or not,

depending on the desire of the company to charge this work to revenue or capital account.

To prepare an analysis of cost it is necessary to bring together the cost of labor, material, and fixed charges, such as mine manager's salary, etc. This

analysis may be divided into two parts, one dealing with the raising of the ore and the other with the preparing it for market (concentration). Only the first of these two will be shown here, as the method of

preparation of the second can be obtained from it by analogy. A printed form should be used similar to the form shown below:—

### Cost Analysis

| Raising Ore  | Total Cost |       |               |       | Average per Ton |               |
|--------------|------------|-------|---------------|-------|-----------------|---------------|
|              | Last Month |       | Current Month |       | Last Month      | Current Month |
|              | Amount     | Total | Amount        | Total |                 |               |
| Salaries     |            |       |               |       |                 |               |
| Laborers     |            |       |               |       |                 |               |
| Machinery    |            |       |               |       |                 |               |
| 1. Labor     |            |       |               |       |                 |               |
| 2. Power     |            |       |               |       |                 |               |
| Hauling      |            |       |               |       |                 |               |
| 1. Labor     |            |       |               |       |                 |               |
| 2. Materials |            |       |               |       |                 |               |
| 3. Power     |            |       |               |       |                 |               |
| Repairs      |            |       |               |       |                 |               |
| 1. Labor     |            |       |               |       |                 |               |
| 2. Materials |            |       |               |       |                 |               |
| 3. Sundries  |            |       |               |       |                 |               |
| Tools        |            |       |               |       |                 |               |
| 1. Labor     |            |       |               |       |                 |               |
| 2. Materials |            |       |               |       |                 |               |
| Sundry Costs |            |       |               |       |                 |               |
| 1. Lighting  |            |       |               |       |                 |               |
| 2. Pumping   |            |       |               |       |                 |               |
| Etc          |            |       |               |       |                 |               |
| Total Cost   |            |       |               |       |                 |               |

In the case of a silver mine the book required to record the shipment of ore is very extensive, and I will not show the ruling here. I will mention, however, what it is necessary to record, so that very little ingenuity will be required to put the columns side by side. The Sales Book must show the date of shipment, the car number, where the ore was taken from, weight at the mine, weight per railroad advice, the result of the assay, name of purchaser, sampling charge, amount per ton, total value of shipment, freight paid, and amount received.

In the monthly report to the head office, information must be shown as to the salaries and wages paid, the purchases of stores, stock of stores on hand and stores used, the sales during the month, the ore raised and treated, and the amount of cash on hand. If the company has an audit at the mine, only summaries need be sent, and no vouchers need accompany these. If no audit takes place at the mine, it is necessary to send full details of all classes of transactions, with vouchers for all payments. The first method is the natural way, and lessens the work both of the head office and of the mine office. By this method the analysis shown above is sent as the wages report, the smelters send two reports of the sales, one of which is sent to the head office, the analysis of costs is sent, and a summary of

the "Stores Ledger." Thus, you see, very little extra work is needed to place the head office in full possession of all the facts necessary for the preparation of their Balance Sheet.

In the next issue we will follow these reports to the head office and prepare books to record the facts shown therein.

(To be continued.)

### RESCUE WORK IN COAL MINES.

Speaking before the Midland Institute of Mining, Civil and Mechanical Engineers, Doncaster, England, Sergeant A. Winborn, who has charge of the joint rescue station at Tankersley, stated that the rescue work done after the Hamstead disaster was probably the most severe test to which any rescue apparatus had ever been subjected. Scores of miners, totally unprotected by breathing apparatus, begged the opportunity of descending the mine. The method of effecting a rescue by means of sheer muscular force and daring, without the aid of scientific apparatus, appealed to the average miner most. Miners viewed the advent of "new-fangled" apparatus with distrust. Consequently they must be brought by experience to a realization of its practical value.



# PRELIMINARY REPORT OF THE MINERAL PRODUCTION OF CANADA IN 1908.

Prepared by John McLeish, B.A., in charge of the Division of Mineral Resources and Statistics.

ANNUAL Mineral Production in Canada since 1886.

|      |               |      |               |
|------|---------------|------|---------------|
| 1886 | \$ 10,221,255 | 1893 | \$ 38,412,431 |
| 1887 | 10,321,331    | 1894 | 49,234,005    |
| 1888 | 12,518,894    | 1900 | 64,420,983    |
| 1889 | 14,013,113    | 1901 | 65,804,611    |
| 1900 | 16,763,353    | 1902 | 63,211,634    |
| 1891 | 18,976,616    | 1903 | 61,740,513    |
| 1892 | 16,633,415    | 1904 | 60,973,897    |
| 1893 | 20,035,082    | 1905 | 69,529,170    |
| 1894 | 19,931,158    | 1906 | 79,057,308    |
| 1895 | 20,505,917    | 1907 | 86,842,765    |
| 1896 | 22,474,256    | 1908 | 87,323,849    |
| 1897 | 28,485,023    |      |               |

## PRELIMINARY REPORT ON THE MINERAL PRODUCTION OF CANADA IN 1908.

(Subject to revision.)

| Product.                                  | Quantity (a) | Value (b)  |
|-------------------------------------------|--------------|------------|
| <b>METALLIC.</b>                          |              |            |
|                                           |              | \$         |
| Copper (e)..... Lbs.                      | 64,361,636   | 8,500,885  |
| Gold.....                                 |              | 9,550,271  |
| Pig iron from Canadian ore (d)..... Tons. | 99,420       | 1,664,302  |
| Lead (e)..... Lbs.                        | 45,725,886   | 1,920,487  |
| Nickel (f).....                           | 19,143,111   | 8,231,538  |
| Cobalt.....                               | 1,833,286    | 112,253    |
| Silver (g)..... Ozs.                      | 22,067,212   | 11,667,197 |
| Total value, metallic.....                |              | 41,655,936 |
| <b>NON-METALLIC.</b>                      |              |            |
|                                           |              | \$         |
| Arsenic..... Tons.                        | 699          | 38,064     |
| Asbestos.....                             | 65,534       | 2,547,507  |
| Asbestic and asbestic sand.....           | 25,239       | 25,829     |
| Calcium carbide.....                      | 6,864        | 417,150    |
| Chromite.....                             | 7,225        | 82,068     |
| Coal.....                                 | 10,904,466   | 25,567,236 |
| Corundum.....                             | 1,039        | 100,389    |
| Feldspar.....                             | 7,877        | 21,099     |
| Graphite.....                             | 251          | 5,565      |
| Gypsum.....                               | 3,843        | 45,128     |
| Ornamentals.....                          | 340,964      | 575,701    |
| Limestone for flux in iron furnace.....   | 418,661      | 280,705    |
| Magnesite.....                            | 120          | 840        |
| Mica.....                                 |              | 191,602    |
| Mineral pigments—                         |              |            |
| Barites.....                              | 4,091        | 18,265     |
| Ochres.....                               | 4,746        | 39,540     |
| Mineral waters.....                       |              | 109,391    |
| Natural gas (h).....                      |              | 1,012,060  |
| Petroleum (i)..... Brls.                  | 527,987      | 747,102    |
| Phosphate (apatite)..... Tons.            | 1,596        | 14,794     |
| Pyrites.....                              | 47,336       | 224,324    |
| Quartz.....                               | 27,134       | 32,277     |
| Salt.....                                 | 79,975       | 378,798    |
| Talc.....                                 | 1,076        | 3,048      |
| Trippite.....                             | 30           | 195        |
| Total value, non-metallic.....            |              | 32,479,006 |

- (a.) Quantity of product sold or shipped.  
 (b.) The metals, copper, lead, nickel and silver are for statistical and comparative purposes valued at the final average value of the refined metal in New York. Pig iron is valued at the furnace and non-metallic products at the mine or point of shipment.  
 (c.) Copper contents of ore, matte, &c., at 12 208 cents per pound.  
 (d.) The total production of pig iron in Canada in 1908 was 630,835 short tons valued at \$8,111,194, of which it is estimated about 99,420 tons valued at \$1,664,302 should be attributed to Canadian ore and \$51,415 tons valued at \$6,446,892 to the ore imported.  
 (e.) Lead contents of ore, matte, &c., at 4 200 cents per lb.  
 (f.) Nickel contents of matte shipped at 43 cents per lb.  
 (g.) Silver contents of ore, &c., at 52 864 cents per lb.  
 (h.) Gross return from sale of gas.  
 (i.) Deducted from the amount paid in bounties and valued at \$1 41½ per barrel.

## PRELIMINARY REPORT ON THE MINERAL PRODUCTION OF CANADA IN 1908—Continued.

(Subject to revision.)

| Product.                                              | Quantity (a) | Value (b)  |
|-------------------------------------------------------|--------------|------------|
| <b>STRUCTURAL MATERIAL AND CLAY PRODUCTS.</b>         |              |            |
|                                                       |              | \$         |
| Cement—natural..... Bbls.                             | 1,044        | 815        |
| " Portland.....                                       | 2,665,285    | 3,709,063  |
| Flux stones.....                                      | 4,000        | 3,600      |
| Sand and gravel (exports)..... Tons.                  | 298,954      | 161,387    |
| Sewer pipe.....                                       |              | 514,042    |
| Clay products, stone, lime, &c., Estimated.....       |              | 8,500,000  |
| Total structural material and clay products.....      |              | 12,888,907 |
| All other non-metallic.....                           |              | 32,479,006 |
| Total value non-metallic.....                         |              | 45,367,913 |
| Total value metallic.....                             |              | 46,655,936 |
| Estimated value of mineral products not reported..... |              | 500,000    |
| Total value, 1908.....                                |              | 87,323,849 |

A preliminary review of the mineral production in Canada in 1908 shows a total mineral output valued at slightly over 87 million dollars as compared with a little less than 87 million dollars in 1907.

The industry has therefore in the aggregate more than held its own despite the large decrease in the prices of the metals. That this falling off in the prices of the metals has been an important and serious question for the metal mining industries, will be better realized when it is stated that had the metals, copper, silver, lead and nickel maintained as high average prices in 1908 as in 1907, their total production in Canada in 1908 would have been worth over 8,000,000 dollars more to the producers than was actually the case.

A comparison of average monthly prices of metals in 1907 and 1908 showing the decreases in 1908 both in price and percentage is given hereunder:—

### COMPARISONS OF PRICES OF METALS, 1907 and 1908.

|              | 1907.  | 1908.  | Decrease in 1908. | Percentage of Decrease. |
|--------------|--------|--------|-------------------|-------------------------|
|              | Cts.   | Cts.   | Cts.              | %                       |
| Copper.....  | 20 004 | 13 208 | 6 796             | 33 97                   |
| Lead.....    | 5 325  | 4 200  | 1 125             | 21 12                   |
| Nickel.....  | 45 43  | 43 2   | 2 41              | 4 44                    |
| Silver.....  | 65 327 | 52 864 | 12 463            | 19 07                   |
| Spelter..... | 5 962  | 4 726  | 1 236             | 20 73                   |
| Tin.....     | 38 166 | 29 465 | 8 701             | 22 79                   |

The outstanding feature of the mining industry during the year has undoubtedly been the silver production, a total increase of over 72 per cent being shown in the number of ounces produced. The metals copper and gold also show important increases in quantity produced, whilst iron, lead and nickel were produced in slightly smaller quantity than in 1907.

In the non-metallic class, decreases in gypsum and petroleum are more than counterbalanced by increases in coal, asbestos, natural gas, salt, etc. The Portland cement industry shows a small increase in sales and a large increase in quantity of cement made with large stocks on hand at the close of the year.

The two following tables will illustrate these special features of increases and decreases, the first showing the total increases or decreases in value of some of the more important products, and the second the percentage increase or decrease in quantity as well as value:—

| Product.                         | Increase.  | Decrease.   |
|----------------------------------|------------|-------------|
| Copper.....                      |            | \$2,806,484 |
| Gold, Yukon.....                 | \$ 450,000 |             |
| Gold all other.....              | 726,494    |             |
| Pig iron, from Canadian ore..... |            | 318,005     |
| Lead.....                        |            | 621,599     |
| Nickel.....                      |            | 1,303,869   |
| Silver.....                      | 3,318,538  |             |
| Asbestos.....                    | 62,739     |             |
| Chromite.....                    | 9,107      |             |
| Coal.....                        | 1,185,393  |             |
| Gypsum.....                      |            | 71,213      |
| Natural gas.....                 | 197,023    |             |
| Petroleum.....                   |            | 309,986     |
| Portland cement.....             |            | 68,265      |
| Pyrites.....                     | 12,333     |             |
| Salt.....                        | 36,433     |             |



| Product.                                    | QUANTITY. |           | VALUE.    |           |
|---------------------------------------------|-----------|-----------|-----------|-----------|
|                                             | Increase. | Decrease. | Increase. | Decrease. |
|                                             | %         | %         | %         | %         |
| <b>Metallic—</b>                            |           |           |           |           |
| Copper.....                                 | 13.86     |           |           | 24.82     |
| Gold.....                                   | 14.03     |           | 14.03     |           |
| Pig iron, (from Canadian ore only).....     |           | 7.60      |           | 16.04     |
| Pig iron, (from home and imported ore)..... |           | 3.22      |           | 11.11     |
| Lead.....                                   |           | 4.22      |           | 24.45     |
| Nickel.....                                 |           | 9.66      |           | 13.67     |
| Silver.....                                 | 72.69     |           | 39.75     |           |
| <b>Non-metallic—</b>                        |           |           |           |           |
| Asbestos and asbestic.....                  | 0.33      |           | 2.73      |           |
| Coal.....                                   | 5.21      |           | 5.27      |           |
| Feldspar.....                               |           | 37.40     |           | 29.27     |
| Gypsum.....                                 |           | 29.83     |           | 11.01     |
| Natural gas.....                            |           |           | 24.00     |           |
| Petroleum.....                              |           | 33.07     |           | 29.32     |
| Salt.....                                   | 10.01     |           | 10.66     |           |
| Portland cement.....                        | 9.41      |           |           | 1.81      |

**Gold.**—For the first time in nine years the gold output shows an increase over the previous year. The Yukon output in 1908 is estimated at about \$3,600,000 as compared with \$3,150,000 in 1907, while a considerably increased production is also shown in the Province of British Columbia, derived chiefly from the Trail Creek ores, the placer workings having shown a smaller output.

In Nova Scotia the output in 1907 was \$282,686. Complete returns are not yet available for 1908, but the output was probably not over \$225,000.

Of the total gold output in 1908, over 44 per cent. was obtained from placer and hydraulic workings and 56 per cent. from sulphuret and quartz ores.

**Silver.**—The estimated silver production of Canada in 1907 was 22,070,212 ounces, shipped as fine bars, silver bullion, and obtained in matte, ore, etc., as compared with 12,779,799 ounces produced in 1907, an increase of over 72 per cent. Owing, however, to the much lower price received in 1908, the total value shows an increase of only 40 per cent. Over 87 per cent. of the output was obtained from Ontario, and the increase is all to be credited to this province, since there was a slight falling off in the silver output of British Columbia.

The price of refined silver varied between a maximum of 57 cents on the 8th January and a minimum of 47 5-8 cents on the 2nd of December, the average monthly price being 52.864 cents per ounce, as compared with 65.327 cents in 1907.

The output from the Cobalt district in the Province of Ontario again shows a very large increase over the previous year, nearly twice as much silver having been produced. Returns from 29 shipping mines show the ore and concentrates shipped as approximately 25,497 tons, containing 19,296,430 ounces of silver, as compared with 14,644 tons containing 9,982,363 ounces in 1907. Valued at the average price of refined silver for the year, the production in 1908 would be worth \$10,200,865, and it represents an average return of 756 ounces of silver or \$400 per ton of ore shipped, as compared with an average return of 681 ounces silver or \$445 per ton of ore shipped in 1907.

If the output of this district continues to increase at the present rate, Canada will in the immediate future become one of the chief silver producing countries of the world. The total silver production of the world in 1907 was approximately 193 million ounces, the chief contributing countries being, Mexico 65 million ounces, United States 59 million ounces, Australia 17 million ounces, Canada nearly 13 million ounces, Germany 12 million ounces. With an output of 22 million ounces in 1908 Canada probably moves up to third place, but

still does not produce more than from 10 to 12 per cent. of the world's output.

**Copper.**—Statistics of copper production in 1908 show a total output of 64,361,636 lbs., an increase of over 14 per cent. over the production of 1907. There was an increase of over 900,000 lbs. in the copper from the Sudbury mines, while preliminary statistics of production in British Columbia appear to show a very important increase in production in that province of over 7,000,000 lbs.

The New York price of electrolytic copper varied but slightly during the year, the lowest being 12 cents in February and the highest 14 1/4 cents in December, the average for the year being 13.208.

The total exports of copper in ore, matte and blister being, according to Customs Department returns, 25,568 tons.

**Lead.**—All of the lead production shown in the general table, viz., 45,725,886 pounds valued at \$1,920,487, was obtained in the Province of British Columbia. The production in 1907 was 47,738,703 pounds, valued at \$2,542,086, a decrease in quantity being therefore shown of about 4 per cent.

The total amount paid as bounty on lead production was, during the twelve months, \$139,064.57.

The exports of lead in ore, etc., during the year were 2,256 tons, and of pig lead 6,971 tons, or a total of 9,227 tons.

The price of lead in New York during the year varied between 3.60 and 4.60 cents, averaging about 4.2 cents per pound.

**Nickel.**—With the exception of the nickel contained in the ores shipped from the Cobalt district, the production of nickel in Canada is derived entirely from the well-known nickel-copper deposits of the Sudbury district. Previous to 1906 the output had been increasing steadily for a number of years. During the past three years however, the production has not varied very greatly. About 815 tons less matte was shipped in 1908 than in 1907. The nickel contents were also somewhat lower in 1908, averaging about 45.1 per cent. as compared with 48.1 per cent. in 1907. On the other hand the copper contents were higher in 1908.

Two companies are carrying on active operations, the Mond Nickel Co., at Victoria Mines, and the Canadian Copper Co., at Copper Cliff. The ore is first roasted and then smelted to a Bessemer matte containing from 77 to 80 per cent. of the combined metals, copper and nickel, which is shipped to the United States and Great Britain for refining.

The price of refined nickel in New York was quoted during the first nine months at from 45 to 50 cents per pound, and during the balance of the year from 40 to 45 cents according to size and terms of order.

The above figures do not include the nickel contents of the silver-cobalt ores from the Cobalt district, of which it is difficult to obtain satisfactory returns. The shippers of silver-cobalt ores receive little or no return for the nickel contents, although this metal forms an important constituent of the ore.

**Iron Ore.**—The total shipments of iron ore from mines in Canada in 1908 were 203,490 short tons, valued at the mine at \$486,857, as compared with 312,496 tons valued at \$666,941 in 1907. The greater part of this production was from the Helen mine, Michipicoten, delivered to Midland and Hamilton. During 1908 very little Canadian ore was exported.

**Pig Iron.**—The total production of pig iron in Canada in 1908 from both Canadian and imported ores



The following were the aggregate results of the operations on the nickel-copper deposits in Ontario in 1906, 1907 and 1908:—

|                                       | 1906.              | 1907.              | 1908.              |
|---------------------------------------|--------------------|--------------------|--------------------|
|                                       | Tons of 2,000 lbs. | Tons of 2,000 lbs. | Tons of 2,000 lbs. |
| Ore mined.....                        | 343,814            | 351,916            | 409,551            |
| Ore smelted.....                      | 340,059            | 359,076            | 360,180            |
| Bessemer matte produced.....          | 20,364             | 22,041             | 21,197             |
| " " shipped.....                      | 20,310             | 22,025             | 21,210             |
| Copper contents of matte shipped..... | 5,265              | 6,996              | 7,503              |
| Nickel " ".....                       | 10,745             | 10,595             | 9,572              |
| Spot value of matte shipped.....      | \$4,628,011        | \$3,289,382        | \$2,930,989        |
| Wages paid.....                       | 1,117,420          | 1,278,694          | 1,286,265          |
| Men employed.....                     | 1,417              | 1,660              | 1,690              |

According to Customs returns exports of nickel in matte, etc., were for twelve months ending December 31, as follows:—

|                       | 1906       | 1907       | 1908.      |
|-----------------------|------------|------------|------------|
|                       | Pounds.    | Pounds.    | Pounds.    |
| To Great Britain..... | 2,716,892  | 2,518,338  | 2,554,486  |
| To United States..... | 17,936,953 | 16,857,997 | 16,865,407 |
|                       | 20,653,845 | 19,376,335 | 19,419,893 |

According to direct returns from nine plants comprising 16 furnaces, was 630,835 short tons, valued at 8,111,194, as compared with 651,962 tons, valued at 9,125,226 in 1907. These figures do not include the output from the two electric furnace plants, making ferro-products, which are situated at Welland, Ontario, and Buckingham, Quebec. Of the total output of pig iron during 1908, 6,709 tons, valued at \$171,383, were made with charcoal as fuel, and 624,126 tons, valued at 7,939,811, with coke.

The amount of Canadian ore, including mill cinder, etc., used was 219,266 tons, while the quantity of imported ore was 1,051,445 tons. The total amount of charcoal used was 1,121,990 bushels, valued at \$85,738. The quantity of limestone flux charged was 483,065 tons.

The plant of the Atikokan Iron Co., Ltd., was out of commission throughout the year, while a number of others were operated for a part of the year only. The blast furnace at Londonderry was in blast for little over a month, and the furnace of the Deseronto Iron Co., Ltd., for about two months.

**Iron and Steel Bounties.**—Following is a statement of bounties paid on iron and steel during the calendar year, as kindly furnished by the Trade and Commerce Department:—

|                                          | 1907.                              |              | 1908.                              |              |
|------------------------------------------|------------------------------------|--------------|------------------------------------|--------------|
|                                          | Quantity on which Bounty was paid. | Bounty.      | Quantity on which Bounty was paid. | Bounty.      |
|                                          | Tons.                              | \$ c.        | Tons.                              | \$ c.        |
| Pig iron made from Canadian ore.....     | 95,914.97                          | 201,421.47   | 101,647                            | 213,438.34   |
| Pig iron, made from imported ore.....    | 537,803.45                         | 591,583.80   | 517,427                            | 569,166.93   |
| Total, pig iron.....                     | 633,718.42                         | 793,005.27   | 619,074                            | 782,628.27   |
| Steel ingots.....                        | 666,589.87                         | 1,099,873.37 | 556,289                            | 917,876.63   |
| Steel wire rods.....                     | 68,738.22                          | 412,417.26   | 49,630                             | 297,778.68   |
| Total bounty paid on iron and steel..... |                                    | 2,305,295.90 |                                    | 1,998,283.58 |

**Steel.**—The returns for the year from eight companies making steel showed a total output of ingots and castings of 588,763 short tons, valued at \$9,233,602, as compared with 706,982 tons, valued at \$15,612,590, from seven companies in 1907.

**Asbestos.**—Returns of shipments of asbestos from the Eastern Townships, Province of Quebec, were received from twelve operating companies who employed 2,643 men in mine and mills and paid in wages \$1,002,768. Several other companies were engaged in development work and preparing to make shipments during the coming year.

The total shipments divided into crude and mill stock were in 1907 and 1908 as follows:—

|                                 | 1907.  |           | 1908.  |           |
|---------------------------------|--------|-----------|--------|-----------|
|                                 | Tons.  | Value.    | Tons.  | Value.    |
|                                 |        | \$        |        | \$        |
| Crude.....                      | 4,327  | 830,633   | 3,346  | 692,232   |
| Mill stock.....                 | 57,803 | 1,654,135 | 62,188 | 2,855,275 |
| Total asbestos.....             | 62,130 | 2,484,768 | 65,533 | 2,547,507 |
| Asbestic and asbestic sand..... | 28,296 | 20,275    | 25,239 | 25,829    |
| Total products.....             | 90,426 | 2,505,043 | 90,772 | 2,573,336 |

Exports of asbestos, according to Customs returns, were:

|                                          | Tons.  | Value.    |
|------------------------------------------|--------|-----------|
|                                          |        | \$        |
| Twelve months ending December, 1906..... | 59,864 | 1,689,257 |
| " " " " 1907.....                        | 66,763 | 1,669,299 |
| " " " " 1908.....                        | 61,210 | 1,842,763 |

**Coal and Coke.**—Each of the coal mining provinces, except British Columbia, contributed an increased out-

put to the coal production in Canada in 1908. The total sales and shipments of coal, including colliery consumption and coal used in making coke, were 10,904,466 short tons, an increase of about 5 per cent. as compared with 1907. Of the total, Nova Scotia contributed over 59 per cent., Saskatchewan and Alberta over 19 per cent., and British Columbia 21 per cent.

The production by provinces was approximately as follows, the figures, of course, being still subject to correction:—

| Province.             | 1907.             |            | 1908.             |            |
|-----------------------|-------------------|------------|-------------------|------------|
|                       | Tons of 2,000 lb. | Value.     | Tons of 2,000 lb. | Value.     |
|                       |                   | \$         |                   | \$         |
| Nova Scotia.....      | 6,354,133         | 12,764,999 | 6,539,866         | 13,138,124 |
| New Brunswick.....    | 34,584            | 77,814     | 60,000            | 135,000    |
| Saskatchewan.....     | 151,232           | 252,437    | 130,000           | 214,500    |
| Alberta.....          | 1,591,579         | 3,836,286  | 1,845,000         | 4,899,611  |
| British Columbia..... | 2,364,898         | 7,390,306  | 2,329,600         | 7,280,000  |
| Yukon.....            | 15,000            | 60,000     | *                 | *          |
| Total.....            | 10,511,426        | 24,381,842 | 10,904,466        | 25,567,235 |

\*No production reported.

The total production of oven coke in 1908 was approximately 865,257 short tons, valued at \$3,668,974, being an increase of about 3 per cent. over the quantity produced in 1907. The coke was made in the provinces of Nova Scotia, Alberta and British Columbia, and entirely from Canadian coal. At the end of the year there were in Nova Scotia about 659 ovens in operation and 173 idle, and in Alberta and British Columbia on the same date 916 in operation and 528 idle, not including the ovens at Hosmer and Comox in British Columbia, from which no returns have yet been received.

**Petroleum and Natural Gas.**—The production of crude petroleum is as usual practically all derived from the Ontario peninsula. Direct returns from the producers have not been obtained, but the production has been estimated on the basis of the bounty of 1½ cents per gallon paid by the Dominion Government. The total bounty paid in 1908 was \$277,193.21, representing a production of 527,987 barrels, compared with a bounty of \$414,157.89 paid in 1907, representing a production of 788,872 barrels. A decreased production of 33 per cent. is, therefore, shown.

Natural gas was produced in the counties of Welland, Halidimand, Norfolk, Kent, Essex and Bruce, in Ontario, and at Medicine Hat, Alberta; the sales from the Ontario fields constituting over 95 per cent. of the total.

The total receipts from gas sold in 1908 show an increase of about 24 per cent. over the receipts of 1907, and are now larger than at any time since the gas was first used.

**Portland Cement.**—Complete statistics of cement production in 1908 have been received from twenty-three operating plants.

The total quantity of cement made was 3,495,961 barrels, as compared with a total of 2,491,513 barrels made in 1907, showing an increase of 1,004,448 barrels, or over 40 per cent.

The total sales were 2,665,289 barrels, as compared with 2,436,093 barrels in 1907, an increase of 229,196 barrels, or over 7 per cent. The total daily capacity of the 23 plants was about 27,500 barrels, as compared

with an operating capacity of 14,300 barrels in 1907. The operating plants were distributed as follows: One each in Nova Scotia, British Columbia and Manitoba, the latter manufacturing a natural Portland, two in Alberta, three in Quebec Province and 15 in Ontario.

Of the 23 operating plants, 12 use marl and clay, ten use limestone and clay, and one blast furnace slag.

The average price per barrel at the works in 1908 was \$1.39, as compared with \$1.55 in 1907.

The imports of Portland cement into Canada during

the 12 months ending November, 1908, were 1,600,934 cwt., valued at \$530,209.

This is equivalent to 457,408 barrels of 350 pounds at an average price per barrel of \$1.16. The imports in 1907 were equivalent to 672,630 barrels, valued at \$837,520, or an average price per barrel of \$1.24½. The duty is 12½ cents per 100 pounds.

There is very little cement exported from Canada; the consumption is, therefore, practically represented by the Canadian sales together with the imports.

#### MINERAL OUTPUT OF QUEBEC FOR 1908.

(Subject to slight correction.)

| Minerals (tons of 2,000 lbs.) | Quantities shipped or used. | Gross Value.   |
|-------------------------------|-----------------------------|----------------|
| Bog iron ore .....            | 11,628                      | \$30,957 00    |
| Calcined ochre .....          | 1,346                       | 15,440 00      |
| Raw ochre .....               | 1,500                       | 4,500 00       |
| Chrome iron .....             | 7,564                       | 83,740 00      |
| Copper ore .....              | 26,598                      | 159,588 00     |
| Asbestos .....                | 65,156                      | 2,551,596 00   |
| Asbestic .....                | 24,011                      | 34,666 00      |
| Mica, trimmed .....           | 106                         | 95,311 00      |
| Phosphate of lime .....       | 175                         | 1,610 00       |
| Prepared graphite ....lbs.    | 2,640                       | 165 00         |
| Magnesite .....               | 65                          | 520 00         |
| Slates .....                  | 4,336                       | 20,056 00      |
| Flag stones .....             | 4,000                       | 3,600 00       |
| Cement .....                  | 801,695                     | 1,127,335 00   |
| Granite .....                 | 30,000                      | 250,000 00     |
| Lime .....                    | 556,000                     | 960,000 00     |
| Bricks .....                  | 94,000,000                  | 5,250,000 00   |
| Tiles and pottery .....       | .....                       | 270,000 00     |
| Limestone .....               | 97,710                      | 223,580 00     |
|                               |                             | \$5,493,664 00 |

6,324 men employed in the mining industry of the Province of Quebec, receiving \$2,094,357 in wages.



## EXPORTS of the Products of the Mine, Year 1908.

(Compiled from Trade and Navigation Monthly Statements.)

| Products.                                | Quantity.  | Value.     |
|------------------------------------------|------------|------------|
|                                          |            | \$         |
| Arsenic..... Lbs.                        | 1,913,732  | 43,493     |
| Asbestos..... Tons.                      | 61,210     | 1,842,763  |
| Barytes..... Cwt.                        | 3,509      | 13,690     |
| Chromite..... Tons.                      | 4,571      | 56,864     |
| Coal..... "                              | 1,729,833  | 4661,377   |
| Feldspar..... "                          | 9,524      | 34,045     |
| Gold..... "                              |            | 7,740,918  |
| Gypsum..... Tons.                        | 280,091    | 324,574    |
| Copper, fine in ore, &c..... Lbs.        | 51,136,371 | 5,934,559  |
| Lead, in ore, &c..... "                  | 4,511,931  | 153,394    |
| " pig, &c..... "                         | 13,942,663 | 469,060    |
| Nickel, in ore, &c..... "                | 19,419,893 | 1,866,624  |
| Silver, in ore, &c..... Ozs.             | 20,884,451 | 12,403,482 |
| Platinum, in ore concentrates, &c..... " | 43         | 937        |
| Mica..... Lbs.                           | 580,195    | 198,839    |
| Mineral Pigments..... "                  | 249,635    | 4,850      |
| Mineral Water..... Galls.                | 8,953      | 3,659      |
| Oil, refined..... "                      | 25         | 296        |
| Ores—                                    |            |            |
| Antimony..... Tons.                      | 149        | 5,647      |
| Iron..... "                              | 4,334      | 72,260     |
| Other ores..... "                        | 13,910     | 509,779    |
| Phosphate..... "                         | 1          | 30         |
| Plumbago..... Cwt.                       | 7,706      | 10,159     |
| Pyrites..... Tons.                       | 17,283     | 96,600     |
| Salt..... Lbs.                           | 527,229    | 3,840      |
| Sand and gravel..... Tons.               | 298,954    | 161,387    |
| Slate..... "                             | 10,709     | 2,539      |
| Stone, ornamental..... "                 | 1,314      | 28,777     |
| " building..... "                        | 4,009      | 14,034     |
| " for manufacture of grindstones..... "  | 661        | 5,991      |
| Other products of the mine.....          |            | 176,007    |
| Manufactures—                            |            |            |
| Bricks..... M.                           | 2,334      | 9,047      |
| Aluminum, in bars, &c..... Cwt.          | 194,546    | 399,785    |
| " manufactured.....                      |            | 1,727      |
| Cement.....                              |            | 34,591     |
| Clay, manufactures of.....               |            | 92         |
| Coke..... Tons.                          | 58,708     | 248,759    |
| Grindstones, manufactured.....           |            | 13,730     |
| Gypsum, ground.....                      |            | 9,765      |
| Iron and steel—                          |            |            |
| Stoves..... No.                          | 651        | 8,258      |
| Castings, N.E.S.....                     |            | 28,062     |
| Pig iron..... Tons.                      | 290        | 10,614     |
| Machinery (linotype machines).....       |            | 126,590    |
| " N.E.S.....                             |            | 285,257    |
| Sewing machines..... No.                 | 9,697      | 109,002    |
| Typewriters.....                         | 3,720      | 169,939    |
| Scrap iron and steel..... Cwt.           | 92,566     | 73,807     |
| Hardware (tools, &c.).....               |            | 57,631     |
| " N.E.S.....                             |            | 59,304     |
| Steel and manufactures of.....           |            | 1,169,673  |
| Lime.....                                |            | 43,316     |
| Metals, N.O.P.....                       |            | 65,360     |
| Plumbago, manufactures of.....           |            | 876        |
| Stone, ornamental.....                   |            | 13,748     |
| " building.....                          |            | 1,446      |

The production of chrome has been as follows:—

|                             | Gross tons. | Value.   |
|-----------------------------|-------------|----------|
| Second-class, in lumps..... | 3,754       | \$38,740 |
| Concentrated.....           | 3,000       | 45,000   |
|                             | 6,754       | \$83,740 |

The production of asbestos was as follows (2,000 lb. tons):—

|                         |        |             |
|-------------------------|--------|-------------|
| First-class crude.....  | 900    | \$261,216   |
| Second-class crude..... | 2,771  | 438,305     |
| Fibre.....              | 13,911 | 716,811     |
| Paper stock.....        | 47,574 | 1,135,264   |
|                         | 65,156 | \$2,551,596 |
| Asbestic.....           | 24,011 | 34,666      |

Pig Iron.—There was 5,989 gross tons of charcoal pig iron valued at \$171,286 manufactured during the year.

The above figures show the value of the product at mine or at nearest shipping point.

## PROPOSED B. C. MINING LEGISLATION.

On February 18th the Hon. Richard McBride, before the B. C. Legislature, introduced a bill to amend the Coal Mines Regulation Act. The bill has to do with coal miners' certificates of competency. It provides that these certificates shall be granted by a board of three. Each board shall consist of one member appointed by the Lieutenant-Governor in Council; one member, with two alternates, appointed by the manager or managers of the colliery; and one coal miner,

with two alternates, actually working in the colliery and possessed of certificates of competency as such. The last member of the board shall be elected by the coal miners working in the colliery. The board will hold office for one year. Boards are to be appointed for each colliery which the Lieutenant-Governor in Council may designate.

Two other bills were introduced by Mr. McBride, one to amend the Companies Act, to the effect that free miners' licenses may be issued to companies; and another to amend the Placer Mining Act, to give the Gold Commissioner power to extend the limits of a claim of bench or dry diggings beyond the limits of the bench or dry diggings, but not to extend 250 square feet.

### MINERAL PRODUCTION OF ONTARIO IN 1908.

| Product.              | Quantity.  | Value.       |
|-----------------------|------------|--------------|
| <b>Metallic—</b>      |            |              |
| Gold . . . . . ounces | 3,465      | \$60,337 00  |
| Silver . . . . . "    | 19,424,781 | 9,125,903 00 |
| Cobalt . . . . . tons | 1,224      | 110,166 00   |
| Nickel . . . . . "    | 10,175     | 1,866,059 00 |
| Copper . . . . . "    | 7,561      | 1,071,140 00 |
| Iron ore . . . . . "  | 199,395    | 537,379 00   |
| Pig iron . . . . . "  | 271,656    | 4,390,839 00 |

\$17,161,823 00

Less value Ontario iron (170,215 tons) ore smelted into pig iron... 456,176 00

Net metallic production .....\$16,705,647 00

| Product.                                      | Quantity.  | Value.       |
|-----------------------------------------------|------------|--------------|
| <b>Non-metallic—</b>                          |            |              |
| Arsenic, refined . . . . . tons               | 702        | \$40,373 00  |
| Arsenic, crude . . . . . "                    | 2,970      |              |
| Brick, tile and other clay products . . . . . |            | 2,600,000 00 |
| Calcium carbide . . . . . tons                | 2,364      | 147,150 00   |
| Cement, Portland . . . . . bbls.              | 2,022,877  | 2,417,769 00 |
| Corundum . . . . . tons                       | 141        | 14,977 00    |
| Feldspar . . . . . "                          | 7,875      | 20,300 00    |
| Graphite, refined . . . . . "                 | 10         | 1,600 00     |
| Gypsum . . . . . "                            | 10,389     | 20,778 00    |
| Iron pyrites . . . . . "                      | 20,970     | 69,980 00    |
| Lime . . . . . bush.                          | 1,850,000  | 357,050 00   |
| Mica . . . . . tons                           | 368        | 73,586 00    |
| Natural gas . . . . . "                       |            | 969,160 00   |
| Peat fuel . . . . . tons                      | 200        | 900 00       |
| Phosphate of lime . . . . . "                 | 881        | 7,048 00     |
| Petroleum . . . . . Imp. gals.                | 18,479,547 | 703,773 00   |
| Pottery . . . . .                             |            | 50,310 00    |
| Quartz . . . . . tons                         | 44,741     | 52,830 00    |
| Salt . . . . . "                              | 79,112     | 488,330 00   |
| Stone . . . . .                               |            | 475,000 00   |
| Talc . . . . . tons                           | 1,016      | 3,048 00     |

\$8,513,962 00

Add metallic ..... 16,705,647 00

Total production .....\$25,219,609 00

The figures given are subject to revision. Values are computed at the selling prices at the mines or works, and in the form in which the substances are produced.

As compared with 1907, there has been a considerable increase in the output of metalliferous mines and

works, and a shrinkage in the non-metallic production, the aggregate for 1908 being about \$200,000 in excess of that for the preceding year.

The falling off in the non-metallic list is mainly in crude petroleum and building materials. The new oil field in Kent County showed a greater proportionate diminution in yield than the older fields in Lambton County. The output of natural gas was materially greater than in 1907.

The silver mines of Cobalt yielded 9,000,000 ounces more than in 1907, but owing to the fall in the price of silver the value was not correspondingly greater. Shipments from the silver mines amounted to 24,485 tons. A little less than a third of the total tonnage was treated in Canadian reduction works, most of the remainder going to the United States, and a small amount to Europe. The ore treated at home was largely high-grade, the lower qualities being sent mainly to smelters in the United States, where they have been found suitable for mixture with other ores.

The nickel and copper output for 1908 was about the same as in 1907, but the valuation is lower.

### PRELIMINARY NOTE.

In a forthcoming issue of the Canadian Mining Journal, Mr. J. W. Evans' work in electrometallurgy will be described. This brief note is published now as a foreward.

In April, 1904, Mr. J. W. Evans undertook to apply electric smelting to the titaniferous and sulphurous iron ores of Hastings County. In August of that year he obtained the first steel directly from iron ores in Canada, and shewed a sample to Dr. W. G. Miller in Toronto, who advised continuing the experiments on a larger scale.

Accordingly, during the next winter Mr. Evans built a 2,000 kw. alternating current generator and exciter, the power supplied to run them being furnished by a 5 h.p. gasoline engine.

From September, 1905, to January, 1906, several pounds of high-grade titanium steel was smelted directly from the titaniferous iron ores, and about the same quantity of mild steel from the sulphurous iron ores of Hastings County. These experiments were described in a paper read before the Quebec meeting of the Canadian Institute in 1906.

Mr. Evans has a larger furnace now under construction, capable of smelting 25 lbs. of steel at a charge, and he expects to have it running before the middle of April.

Mr. Evans has also obtained a high grade of steel from iron sands in this furnace. No briquetting is required, as the sand is fed to the furnace in the fine state, and there is no blast to interfere with the feed. There are large deposits of ferrous sands in Ontario and Quebec, the cost of concentrating which is far below the cost of mining and grinding ore.

Titanium steel is being used more extensively every day, and it is only a question of time till the titaniferous ores of Ontario and Quebec will be used for steel-making.



# THE MINING OPERATIONS OF THE DOMINION COAL COMPANY.

By F. W. Gray.

(Continued from issue of Jan. 1, 1909.)

## THE EMERY SEAM AND LOWER SEAMS OF THE GLACE BAY BASIN.

### Chapter V.

The Emery Seam is found below the Phalen at depths varying from 160 to 180 feet. It averages from 4 feet 6 inches to 5 feet in thickness, but it has been found as thin as 1 foot 6 inches, and it is stated, although the fact cannot be given as a certainty, that the seam thickened out to 11 feet near Schooner Pond. Generally speaking, it is more irregular both in thickness and in depth than is usual in the seams of this Basin. The coal is harder than that of the thicker seams which overlie it, and will stand handling better. The analysis shows a high percentage of fixed carbon and although the ash contents are higher than the Phalen coal, it makes an excellent house or steam coal. The heating value approaches 14,000 B.T.U.'s. Twenty-five years ago the coal bore an excellent reputation as a steam coal, for which purpose, judging from the analysis, it seems to be specially adapted.

The measures immediately above the Emery are extremely rich in fossil remains. Some of the best fossils that have been found in the Sydney Coal Field have been taken from the roof of this seam, and whenever a shaft has been sunk to it the presence of characteristic fossils has told the seekers that Emery Seam was not far below.

The seam was first worked at the Acadia Colliery, Schooner Pond, about midway between Big Glace Bay and Cow Bay. The principal in this Company was Mr. Ross, who opened up a level from the shore in 1863. For some time the seam was known as the Ross Seam, but it afterwards came to be referred to as the Emery Seam, and it is stated to have been so named after Dr. Emery, of Boston, a director of the old Glace Bay Mining Company. As before stated, the seam was thicker at Schooner Pond than it has been found to be elsewhere. The property was afterwards acquired by the Glasgow & Cape Breton Coal & Railway Company, who built a narrow gauge railway from Schooner Pond to Sydney Harbour. Later the mine was taken over by the Sydney & Louisburg Coal & Railway Company, and passed from them into the hands of the present owners. Very little coal has been taken out of the seam at this point. From 1866 to 1872 the mine did not work; from 1872 to 1879 it was worked intermittently, and was closed in the last-named year, and has not since been re-opened.

The seam was also opened at Reserve Mines in 1873 by the Cape Breton Coal & Railway Company, who drove slopes from the outcrop. Between 1873 and 1875 the mine produced about 56,000 tons before it was closed down. When the property came into the hands of the Sydney & Louisburg Coal & Railway Company they drove a steeply dipping cross-measure drift out of the Main Slope in the Phalen Seam, cutting the Emery Seam at the extreme dip of their areas and worked the coal to the rise. In 1885 they sank a stapple pit from the Phalen to the Emery workings for purposes of ventilation. Working was once again

discontinued, and again recommenced in 1891. When the Dominion Coal Company took over the property in 1893 their policy was to work the thicker and more profitable seams, and along with several others the Emery Mine was closed.

In 1899 the Dominion Coal Co. sank slopes from the outcrop of the Emery Seam near the bankhead of the present No. 3 Colliery. The slopes were driven down for 1,600 feet, and were abandoned in 1901. They are now full of water. These workings were known as No. 4, a name which still survives in the nomenclature of the post office, to the bewilderment of passengers on the tram line, who are generally directed to alight at "No. 4" if they wish to go to "No. 3."

In 1905 the Company once more decided to operate the Emery Seam, and they pumped out the old workings at Reserve. The coal was first taken out by way of the old stone drift and disused main slope of the Phalen Seam on to the old bankhead, which was afterwards burnt down. The stapple pit before referred to was used to lower men in order to avoid the necessity of their travelling the steep drift. In 1906 a shaft 169 feet deep was sunk to the Emery Seam close by the old bankhead; a connection was made with the workings below the drift by headings driven from both ends, which met successfully. Coal was first hoisted from the new shaft in July, 1907. The output from this seam was 47,518 tons in 1906, 100,617 tons in 1907 and 163,000 tons in 1908. At the present time the mine (known as Dominion No. 10) produces 800 tons per day. In the beginning of the 1909 season it is anticipated that No. 10 will have an aggregate in the various levels of 5,000 feet of longwall face, and will reach the maximum output that it is expected to produce, namely, about 1,000 tons per day.

The surface equipment of the colliery is small, as it is served by the same power plant as No. 5, the coal being dealt with on a common bankhead which was previously referred to in the description of No. 5 Colliery (Reserve).

The coal hoist is a double, slide-valve, horizontal engine, cylinders 20 inches by 42 inches, made by the Jenckes Company. The hoisting rope is  $1\frac{1}{4}$  inches in diameter passing over 12 ft. pulleys. The headframe is similar to that described at Dominion No. 7. The cages are 15 ft. 10 in. long by 7 ft. 9 in. high, and take two cars at a trip. The cars are pushed in and out of the cage in the same manner that was described in the reference to International Colliery. The shaft is rectangular, timbered with buntons 8 inches square, spaced every 4 feet and lagged behind with 3-inch scantlings.

The underground haulage is endless rope, operated by clutch gearing from the same engine that drives the French Slope rope in the Phalen Seam. The rope used is 1 inch in diameter and 6,000 feet in length. The mine cars are of special design for the low seam. They are 6 feet 4 inches in length, 2 feet 8 inches from the rail to the top of the box and 3 feet 6 inches wide. They weigh, empty, about 580 lbs.

The coal is undercut by rotary-disc coal-cutters



worked by compressed air. The mine is equipped with nine of these machines of the "Diamond" type, one of the special features of which is that it dispenses with rails and jigs itself along the pavement on a steel sled. Two of the machines cut 4 feet 6 inches under; the others have a larger wheel, and make a 5 feet 6 inches undercut. The coal is blasted down, the explosive used being "Rippite." Pneumatic machines are used in the development work.

At the present time the gate roads are spaced 40 feet apart, but the management are endeavoring to get them 80 feet apart, and more if possible. The horses are now taken up the gates to the face, but as the workings advance it will not be possible to continue this. The pitch of the seam is not at present steep enough to admit of gravity planes being successfully worked, but it will be necessary as the workings advance to devise some method of mechanical haulage in the main gates. At the present time the Company are considering the purchase of longwall face-conveyor belts, which will take the coal along the face and deliver it at the head of the main gates, thus avoiding the necessity of taking the mine cars into the face and saving a certain amount of breakage. Machinery of this type is being successfully worked at the present time in Europe.

The workings are ventilated by a Stines fan 8 feet in diameter. A small air-shaft 30 feet deep was sunk from the surface in 1908 on to the main slope of the Phalen Seam, and the air for the Emery workings goes down the staple pit before mentioned. The pit bottom and the main approaches of the mine are lit by electric incandescent lamps, and safety lamps only are used in the workings.

The development of No. 10 to its present condition has been a slow and difficult process, owing to the method of extraction adopted. The native miners, and their fathers before them, have all been accustomed to working in high and dry seams, and to the "pillar and room" system of extraction, with its accompanying classification of labor, and they prefer to work in these seams so long as it is possible. The Coal Company have been compelled to import miners used to the longwall method from European mining countries, where this mode of extraction is general. A large proportion of the miners in the Emery are from Belgium, and there are quite a few workmen from Middle Europe. Conversation therefore in the workings is occasionally a little mixed.

**The Lower Seams.**—The thickness and characteristics of the Emery Seam adapt it for extraction by the longwall method, which is a comparative novelty in Cape Breton. This mode of extraction has been tried on a limited scale at the Gardiner, the Gowrie, the Victoria Mines and, of course, in the Emery itself. What is true of the Emery seam is also true of all the lower seams in the Glace Bay Basin. In the longwall extraction of coal the seam is taken out in one operation by successive slices along an extended portion of the seam. The haulage-roads, air-roads and general means of communication through the waste or goaf, that is, through the territory where the coal has been extracted is maintained by building pack-walls to support the roof. These packs are constructed in the same manner as the dry stone walling which one sometimes sees on the surface. The thick seams of the Glace Bay Basin, which up to the present time have been worked to the practical exclusion of the thinner seams, have all been extracted on the "short-wall," or what is better known

as the "pillar and room" system. In this mode of extraction a square of coal is extracted, and a square is left to support the roof. The plan of the workings of such a mine resembles therefore a checker-board, the alternate squares representing solid coal and goaf. A seam such as the Phalen or the Hub, which consists of from 7 feet to 9 feet of clear coal without any dirt bands, cannot be worked by the long-wall system, as the seam contains no waste material that can be utilized to pack the roads and the goaf. In the thinner seams the roof has to be taken down in the roads to make height for the men and the horses; a process that has to be repeated from time to time as the superincumbent strata presses down to fill up the vacant space left by the extraction of the coal seam. This roof stone and the stone that is taken down in the faces will provide sufficient material for packing the goaf and maintaining the gate roads. As previously mentioned, it is probable that the Emery and all the seams below it will be mined altogether on the longwall system of coal extraction.

Below the Emery Seam are to be found the Lorway Seam, Clarke Seam, Martin Seam, and the Mullins Seam. None of these have been worked to any great extent, and the most valuable portion of all of them is included within the areas of the Dominion Coal Company. In looking over a map of the leases of coal areas in the Glace Bay Basin, one cannot help but be struck by the wisdom with which the areas of the Dominion Coal Co. are chosen, as they include the most valuable portions of all the coal seams; and it is no exaggeration to state that the seams not included within the leases of the Dominion Coal Company are seams which cannot be worked with profit in the present state of the coal trade, or in competition with the Coal Company.

Referring to the section of the coal measures which is given in the description of No. 2 Colliery, it was pointed out that from the Hub to the Lorway Seam, the measures hold nearly 40 feet of coal in a total depth of a little over 1,300 feet. The lowest of the workable seams is the Mullins Seam, and, judging from the data of the Geological Survey, it will be found about 1,400 feet below the Gardiner Seam, or at a total depth from the surface at No. 2 of from 2,700 to 3,000 feet; so that in the land area of the Glace Bay Basin the Coal Company have all the seams within workable limits of depth. However, until the thicker and more profitable seams which the Company own in the land and submarine areas of the Glace Bay Basin, and in their magnificent property in the Langan-Victoria areas (which will be later referred to in detail) approach exhaustion, it is not probable that anything below the Lorway Seam will be worked. As the collieries on the Phalen Seam, such as Reserve, Caledonia, and in fact all the older collieries, become depleted, the present plant will doubtless be used for mining the Emery and the Gardiner (or Lorway), and the life of these collieries may be considered for the purposes of the present generation as indefinitely prolonged.

We may expect in Cape Breton as time goes on the same appreciation in the value of coal fields as has taken place in older countries. In England, for example, the thicker seams, such as the Barnsley Bed in South Yorkshire, and the Thick Coal in South Staffordshire, are rapidly being worked out, and seams are now being mined which were at one time entirely neglected. By the use of coal-cutting machines, electric power transmission, longwall face-conveyors and the general improvements in mining practice afforded by modern



equipment, it has been found possible to successfully and profitably mine coal-seams that do not exceed 16 inches in thickness. When it is considered, therefore, that there are in the Glace Bay Basin not less than six seams of coal practically untouched, which are each over three feet in thickness, and that in addition to this the Coal Company's submarine leases in the Glace Bay Basin, the Lingan-Victoria tract and near Point Aconi, in the Sydney Mines Basin, are as yet almost virgin, it will be seen that there is not yet any need for anxiety as to the coal resources.

The amount of information that is available with reference to the lower seams is extremely meagre, and very little more is known about them at the present time than is contained in the transactions of the Mining Societies and the writings of Mr. Richard Brown, which are dated in the 'seventies. This fact is in itself a commentary on the previous remarks, for with such large resources actually proved and within sight it has not been thought necessary to do much prospecting.

seven workable seams of coal situated inside the productive coal measures. The edge of the Millstone Grit lies one and a quarter miles inland along this line, and proceeding further, the Mullins Seam is met with at a distance of two and a quarter miles from Low Point.

Following the seams along the coast from the Bridgeport Anticline, they are found to dip at an average angle of 10 degrees until the Barachois Pond is passed. On the eastern side of Low Point the dip is 15 degrees, and increases through a distance of three-quarters of a mile to 24 degrees on the western side. The rapid increase in the dip continues until at the point where the Victoria Seam passes under Sydney Harbour, two and a quarter miles distant from Low Point, the seams are inclined at a maximum angle of 40 degrees. At the shore-crop of the Mullins the dip has decreased to 30 degrees, and at South Bar, one and a half miles further up the Harbour, the inclination is once more 10 degrees.



## Chapter VI. LINGAN-VICTORIA AREAS.

This portion of the Sydney coal field has been less worked than any of the other basins, and its seams are to-day practically intact. The whole of the coal seams in the territory shown on the accompanying sketch map are under lease to the Dominion Coal Company, as the direct successors of the General Mining Association, and they constitute a magnificent asset.

The western boundary of the field is a disturbance of unknown extent under the waters of Sydney Harbor. The eastern limit is the Bridgeport Anticline. From the point at which the crops of the coal-seams disappear under the waters of Indian Bay, or, as it is some times called, Lingan Bay, to where they are visible on the shores of the lower reaches of Sydney Harbor, measures seven miles. About midway in the sweep of the seams is the flat promontory of Low Point. A line drawn inland from this point will cross the outcrops of

The disturbance previously referred to, which undoubtedly exists under the Harbor between the coal seams of Lingan-Victoria and those of the Sydney Mines Basin, is in all probability the continuation of the synclinal fold underlying the northwest arm of Sydney Harbour. The indications afforded by the configuration of the shores of the Harbour from South Bar to Low Point and the rapid increase in the dip of the seams on the Victoria shore compared with the regular dip of the seams at Sydney Mines and the undersea workings of the Nova Scotia Steel & Coal Company on the other side, suggest that the disturbance lies very close to the eastern shore of the harbour, and may be accompanied by faulting.

The relation of the seams in the two foregoing basins has for a good many years been an interesting subject for speculation, and one which presents a good many difficulties. The relation of the Lingan-Victoria seams to those of the Glace Bay Basin does not, however,

present such difficulties, as will be seen from a study of the following sections:—

| Lingan-Victoria. |               |              | Glance Bay.  |          |
|------------------|---------------|--------------|--------------|----------|
| Seam.            | Measures.     | Total Depth. | Seam.        | Measures |
| Carr Seam ...    | 3' 0"         |              |              |          |
|                  | 170' 0"       |              |              |          |
| McNeil .....     | 3' 5"         | 176'         |              |          |
|                  | 341' 0"       |              |              |          |
| Barachois ....   | 6' 0"         | 523'         | Hub .....    | 9' 6"    |
|                  | 55' 0"        |              |              |          |
| Dunphy .....     | 3' 0"         | 581'         |              | 404' 6"  |
|                  | 306' 0"       |              |              |          |
| Victoria .....   | 7' 0"         | 894'         | Harbour ...  | 5' 6"    |
|                  | 257' 0"       |              |              | 253' 0"  |
| Fairy H. ....    | 3' 5"         | 1,154'       | Boutilier .. | 3' 9"    |
|                  | 66' 0"        |              |              | 73' 0"   |
| Northern H. .    | 5' 0"         | 1,225'       | Back Pit...  | 2' 7"    |
|                  | 113' 0"       |              |              | 115' 0"  |
| Lingan .....     | 8' 0"         | 1,346'       | Phalen ....  | 8' 6"    |
|                  | 134' 0"       |              |              | 160' 0"  |
| Emery .....      | 2' 8"         | 1,483'       | Emery ....   | 4' 6"    |
|                  | (?) 1,000' 0" |              |              |          |
| Mullins .....    | 6' 0"         |              |              |          |

It is usual to give two sections of the Lingan-Victoria seams for the reason that there is a large differ-

of the country between the outcrop of the 2 feet 8 inches seam, or Emery, and the outcrop of the lowest seam of all, namely, the Mullins. If the above correlation of the seams as yet unproved lying between the outcrops of the two seams last mentioned.

The only two seams that have been worked to any extent are the Lingan Main and the Victoria Seams, and the total yield of the whole coalfield as far back as records extend has not exceeded 2,000,000 tons.

The Lingan Main Seam was opened by the General Mining Association in 1855, and a short railway was constructed about a mile in length to a small harbor in Indian Bay. The mine appears to have closed down about 1885.

The Victoria Seam was first operated by the Victoria Company, who opened a mine in 1865 to work submarine coal areas under Sydney Harbour. The slopes were driven on the property of the G.M.A., who owned the land area. At that time the "Victoria" seam was known as the "Ross." From 1878 to 1883 the mine was idle, and was taken over about 1884 by the Lingan and Low Point Coal Company, from whom it passed into the hands of the Dominion Coal Company. They continued to work the seam vigorously until 1897, when the workings were abandoned in accordance with the policy of concentration which was being followed at that time. As successors of the former owners, the



Large Reservoir, showing Dam and Miners' Houses under construction—Reservoir capacity, 7,200,000 gallons.

ence between the measures on the Lingan side compared with those on the Victoria side. There is not, however, any very marked variation in the seams themselves, although in one case, that of the Lingan seam, a small parting thickens out until it separates one seam into two, but there is a general thickening of the measures between the coal seams as they approach the Victoria side. Mr Richard Brown, in commenting on this, writes: "The thickness of the intervening strata in the Low Point is nearly four times greater than in the Lingan section—a phenomenon by no means unusual in almost every coal field where the persistency in the coal seams exceeds that in the sedimentary strata with which they are associated."

The section just given is a representative one, and gives a fair idea of the number of workable seams which are present in this tract. The equivalents of the four best known seams in the Glance Bay Basin, namely, the Hub, Harbour, Phalen and Emery seams, are all present. Altogether there are eight seams at least which are workable, but taking the conservative figure of 20 feet of workable coal in the best seams only, it is estimated that these areas should yield approximately 400,000,000 tons. It should be taken into consideration that as yet practically nothing is known

Dominion Coal Company own the railway right-of-way and the old Victoria shipping pier shown in the sketch.

The General Mining Association also proved the Barachois Seam by driving slopes from the surface near the Barachois Pond, but no coal appears to have been shipped from this point.

The settled portion of this coalfield consists of a narrow strip of cultivated land skirting the coastline, between the sea and a wooded hinterland. The farmers and fishermen who constitute the population are mostly the direct descendants of the original settlers, and some of them can relate interesting reminiscences of those more primitive days. Irish names predominate, and are well represented in the nomenclature of the seams, as instance such names as Dunphy, Keefe, Carr, McNeil and McGilvray, not to mention the "Phalen" on the other shore. It is supposed that the word "Lingan" is a corruption of the French words "l'Indien," and this assumption is corroborated by the fact that the neighboring arm of the sea is called Indian Bay. The word "Barchois" is a very common one in Cape Breton. It is no doubt of French origin, and is usually given to a small salt-water lagoon almost, but not entirely, separated from the sea by a low sandbar. It has been suggested that the original spelling of the



word was "barre-a-choir," from "barre," a sandbar, and "choir," to fall away, or an opening in the bar. The word is sometimes spelt "Barasois," but doubtless this is a corruption.

In the summer of 1907 the Coal Company decided to open new collieries, and did a large amount of preliminary prospecting work. They finally determined

eral development of Dominion No. 12 as it is was at the end of 1908. The work of construction is now going on and the description is necessarily incomplete, as all the details have not yet been finally worked out.

The site of the colliery is well chosen, and has been cleared out of an almost completely wooded country. It lies near the stream known as Irish Brook, which



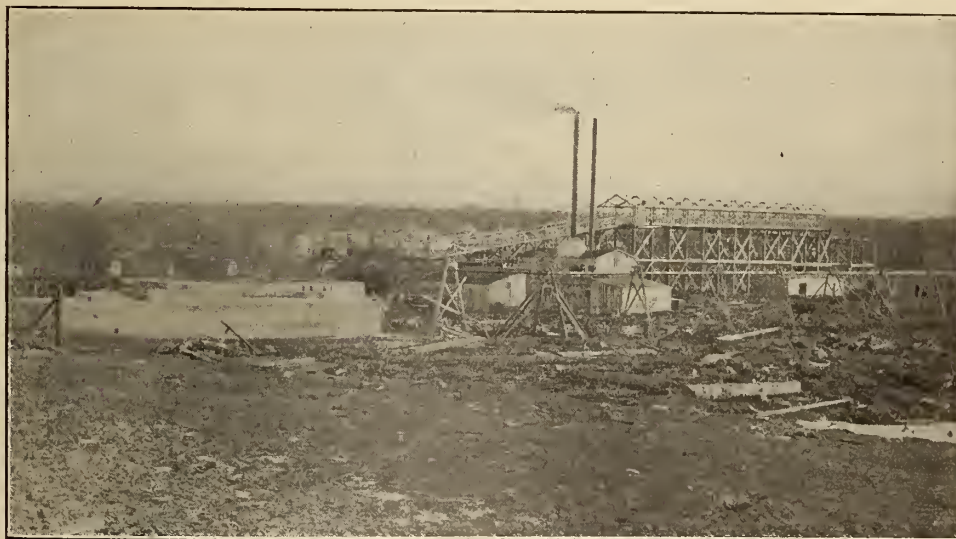
Dominion No. 12—General View of Colliery in December, 1908.

upon opening a slope mine on the Victoria Seam not far from Barachois Pond, and another opening on the same seam about a mile to the eastward. These two collieries are named respectively Dominion No. 12 and No. 14. Another colliery, to be called No. 15, is projected on the Lingan Main Seam, but the site is not as yet definitely decided upon.

**Victoria Seam, Dominion No. 12.**—This seam is supposed to be the equivalent of the Harbour Seam of the

forms the Barachois Pond at its mouth. Near the colliery this stream runs through a ravine, and by a slight expenditure on an earthen dam an adequate water supply has been obtained, which will supply the demands of this group of collieries for some time to come.

At the end of 1908 the slopes were driven in from the surface for a distance of 1,600 feet, and it is anticipated that by the summer of 1909 sufficient territory



Dominion No. 12—General View taken in December, 1908, Shows bankhead framework, foundations in the forefront and miners' houses in the background.

Glace Bay Basin and of the Main Seam of the Sydney Mines Basin. When it was mined by the old Victoria Company the coal had an excellent reputation, which the present product seems likely to uphold. The coal is low in ash, very free burning and does not clinker.

Following is a description of the plant and gen-

will have been opened out to give a daily output of 500 tons. The equipment of the colliery is designed to deal with from 1,000 to 1,200 tons per day, a capacity which will in all probability be reached by the shipping season of 1910.

The seam as proved at No. 12 and No. 14 is 6 feet 7 inches in thickness, and is pitching at an average rate



of 22 per cent. The pitch was very much steeper at the edge of the crop, but flattens out as it goes farther to the deep both at No. 12 and No. 14 slopes. The workings are laid out to take advantage of the pitch of the seam, and the coal will be worked uphill from the levels by rise "balances" or gravity plane-haulages. The pillar and stall method of extraction will be used; rooms, 20 ft. wide; pillars, 20 ft. by 70 ft., and levels every 450 feet. Mechanical haulage will be used along the levels worked by a small winch at the end of each level. Trip haulage will for the present be used on the main roads. The workings are, however, being laid out with a view to the possible introduction of endless haulage at a later date. The style of pit tub adopted is not so large as is usual in the Glace Bay Mines, owing to the heavier pitch in the Lingan areas. The tub is 5 feet 8 inches long by 3 feet 2 inches wide by 2 feet inside depth, over-all length 6 feet 10 inches, capacity 2,240 lbs., rail gauge 2 feet 6 inches. At the present time the seam is being worked by hand-picks. Mining machines will be put in later, and the type chosen will,

of course, depend largely upon the power system which is adopted.

The form of power that is to be used in the group of collieries now being described is not yet definitely decided upon, but it is very probable that they will be operated by electricity. A proposal is being considered to install exhaust steam turbines at Dominion No. 2 Colliery, and to generate electric power there for transmission to the Lingan collieries, but this proposal is not at the present time sufficiently matured to enable a definite statement to be made.

At the present time there are two 250 h.p. Babcock & Wilcox boilers in a temporary house. The permanent boiler-house is not yet erected, and it is not yet definitely decided how many boilers are to be laid down. When the house is built it will be of brick and steel construction, similar in design to the one at No. 6 Colliery.

A temporary air compressor is being run to work the underground pumps. The permanent compressors are not yet purchased.

(To be continued.)

## EXCHANGES.

**The Mining World, February 20, 1909.**—Arthur Lakes, in an article entitled, "The Many Varied Occurrences of Ore in Veins," writes of the widely diverse manners in which ores of the precious metals occur. "Any cavity, opening, or weak zone in the crust of the earth, formed by whatever agency that is susceptible of being filled or saturated by waters carrying vein and metallic solutions, is capable under proper conditions of depositing ores and becoming an ore body. Obviously the nature and appearance of these openings must be very varied." Mr. Lakes then goes on to discuss the so-called true fissure vein.

**The Engineering and Mining Journal, February 27, 1909.**—Nevada gold camps have provided world's records in high-grading. Mr. Mark R. Lamb, in this number of the E. & M. J., narrates a few picturesque incidents of ore-stealing in the Goldfield camp. One of these narrates how a miner, seated on the curb in front of a bank, requested the assistance of a passerby. The miner explained that ore, not whiskey, was his load. From the crown of his Stetson to the top of his boots he was laden with specimen ore.

Apparently there was no difficulty in disposing of stolen ore and bullion. The owners of one mill advertised openly to buy bullion. They were known to have bought from their own employees bullion that was stolen from their own mill.

**The Iron and Coal Trades Review, February 19, 1909.**—After summing up briefly the Privy Council decision in the appeal of the Dominion Coal Company, the Review concludes its editorial thus: "Their Lordships dismissed the appeal, with costs. . . . The effect of this is that the Steel Company obtain full damages, as they will be assessed by the Canadian court to whom the question of amount is remitted; they do not obtain fulfilment of the contract. . . . The case affords another instance where the conditions of a contract of

great importance are left to a few loose words of quite extraordinary elasticity. That may be an advantage sometimes; but for a steel company of this importance to contract for 'all the coal it may require for use in its own works,' without anything to show that it was for steelmaking, is surely exceptionally open wording."

**The Engineering and Mining Journal, February 20, 1909.**—A synopsis of an address delivered by Dr. James Douglas, at Biska, Arizona, appears in this issue. The address is a resume of the history of the Copper Queen Mine. Dr. Douglas went out to Arizona in 1880, to look at what has since proved to be the Verde mine. Being disappointed in this prospect, he visited, with his friend Riley, the only mine then opened in the district, the Copper Queen. This was early in 1881. The mine throughout August and until January, 1882, yielded ore carrying 20 to 25 per cent. copper. In spite of mining men's prejudice against copper ores that occurred in limestone, Dr. Douglas was strongly in favour of purchasing the mine; \$10,000 was the price then asked. In the following year Dr. Douglas advised Phelps, Dodge & Co., to purchase the property for \$25,000, the price then asked.

Dr. Douglas refers to the transaction thus: "I gave them the opinion that if they were poor men and it would likely impoverish them to buy it, they had better leave it alone; but if they were in a position to throw their money away, to take it." When the new owners had got as far as the 400 ft. level the ore had cut out entirely. This was in 1884. Only three months supply of ore was left. Money also was scarce. Dr. Douglas and his friends determined to follow a little streak of ore on the Atlantic claim. The expenditure of a few thousand dollars brought them into "another glorious body of ore." The Queen, at the same time, encountered the same body. The Copper Queen Consolidated Mining Company was formed in August, 1885. Its good and evil times are vividly described.



## INDUSTRIAL PAGE.

The Nova Scotia Steel & Coal Co., of Sydney Mines, N.S., have recently ordered from the Robb Engineering Company, of Amherst, N.S., a 54-inch double inlet Sirocco mine ventilating fan, also a 125 h.p. Robb-Armstrong automatic engine for driving the fan.

On December 14th, 1908, a large gathering witnessed the first run of the new 1,000 kw. Belliss-Morecom engine which was installed at the Johannesburg municipal power station. The new engine is similar to two other large units in the power station. They were all built by Belliss & Morecom.

We have received from the Allis-Chalmers-Bullock Company, Montreal, a remarkably effective calendar. A striking picture of beavers at work has under it the legend, "The First Engineers." As the Allis-Chalmers-Bullock people are manufacturers of hydro-electric power machinery, this legend is most appropriate. The calendar runs from March, 1909, to March, 1910.

**Westinghouse Traction Brake Company, Pittsburgh.**  
**Instruction Pamphlet No. T. 5042, December, 1908.**

The electric pump governor is a device for controlling automatically the operation of motor-driven air compressors between predetermined minimum and maximum air pressures. The pamphlet, whose title is given above, describes types J and J-4. Type J is a governor for use with direct-current or single-phase alternating-current motor-driven air compressors. Type J-4 is used in industrial service, with two-phase (3 or 4 wire) or three-phase circuits, 100 volts to 550 volts, controlling compressor motors up to and including 15 h.p.

In the United States Circuit Court for the Northern District of Illinois the judge filed a decree in the case of the General Electric Company against the Morgan-Gardner Electric Company on Bassett patent 56792, granted March 20, 1894. This decree is the outcome of a suit brought by the General Electric Company to restrain the Morgan-Gardner Electric Company from the further infringement of the Bassett patent in the manufacture and sale of certain electric motors for use on electric mining locomotives. The court holds that the patent is valid and the defendant has infringed. The Bassett patent relates to a form of railway motor in which the field frame is diagonally split so as to allow ready access to the armature or interior parts of the motor, without removing the motor from the locomotive or car to which it is attached, and in which the parts are thoroughly protected from injury. The form of motor held to infringe in this case is the one which the Morgan-Gardner Electric Company has been selling for a number of years as its standard motor.

**The Hennig Concentrator. The Ore Dressing Machinery Co., 114-118 Liberty Street, New York.**

The Hennig Ore Concentrator embodies some new ideas in riffled tables. These ideas include the "Hennig" sinuously curved riffle, the substitution of an even reciprocal drive in place of jerking or bumping, and the introduction of a new motion to one portion of the

table, which, it is claimed, gives a greatly increased efficiency.

The base of the Hennig, consisting of two heavy 8-inch channels 14 ft. 6 in. long, rests upon three heavy cross-timbers, or may be directly set upon a concrete foundation. Three short 8-inch channels are riveted to the bottom of the long channels. These space the long channels accurately, and stiffen them materially. On top of the channels the eccentric drive and the two cradle supports are firmly bolted. The drive consists of a one-piece heavy casting containing three bearings. A double eccentric provides a simple and positive adjustment for the length of stroke from 0 to 15-16-inch in increments of 0.001 inch.

The table is 16 feet long by 7 feet wide. The deck is made of strips of clear white pine laid in white lead and placed diagonally. The most satisfactory covering has been found to be heavy canvas coated with asphaltum. Both covering and riffles are put on the table before shipment.

## CORRESPONDENCE.

March 8, 1909.

Editor Canadian Mining Journal:

Sir,—The article on "Our Visible Supply of Brick," by Professor Baker, in a recent issue, brings the practical side of the matter before us in an excellent way; but his Pleistocene geology is so different from our modern views on the subject that it is worth while to show what changes have been made in our knowledge of the Ontario pleistocene since the *Geology of Canada* appeared in 1863.

The old terms of Erie and Saugeen clays are no longer useful, since we know that the so-called Erie clay was laid down partly as boulder clay and partly in several glacial lakes. The term really includes clays of different origins, which should have different names, corresponding to the bodies of water in which they were formed.

The Saugeen clay is not of separate origin from much of the Erie clay. It is often only the shallow water deposit near the edge of a glacial lake, and connects up with blue Erie clay laid down in the deeper waters of the same lake. In other cases it is simply weathered Erie clay, from which the lime has been leached.

The statement that an ice dam was formed across Eastern Ontario through Perth, Ottawa, etc., about the middle of the glacial period, separating fresh water on the west from salt water on the east, is entirely incorrect. The ice dam which held in the fresh waters of Lakes Algonquin and Iroquois in Western Ontario occupied the whole St. Lawrence valley, leaving no place for salt water.

The enlarged Gulf of St. Lawrence did not cover Eastern Ontario till this ice dam was completely removed from the southern part of the province, so that the Leda clay is thousands of years later in origin than the so-called Erie clay, and was formed when the climate of Ottawa was the same as at present.

May the remark be made, in conclusion, that this criticism of the geology of the paper implies no reflection on its value from the economic side.

Yours truly,  
A. P. COLEMAN.  
Department of Geology, University of Toronto.



## SPECIAL CORRESPONDENCE

## NOVA SCOTIA.

## Glace Bay.

**Eight Hour Commission of Enquiry.**—During the past fortnight the Eight Hour Commission has continued its labors, interviewing and examining representatives of employers and workmen in the coal and iron industries around Sydney and Glace Bay. It is expected that a preliminary report will be given by the Commission at no distant date, to be followed by a more detailed publication.

**The United States Antagonist of the P. W. A.**—The executive of the U. M. W. of America has kindly sent down two of its agents to Cape Breton to assist in the squelching of the Provincial Workmen's Association of Nova Scotia. In the inception of this movement the agents of the American order posed as missionaries who having heard the Macedonian cry of oppression that rose from Nova Scotia were constrained to come to the aid of their distressful brethren. They have now thrown off this mask of pretence, and are publicly stating that it is their earnest hope that the P. W. A. is—as one of their speakers in Sydney put it—"a thing of the past." This same speaker expressed a pious wish, which we are sure must be re-echoed in every true Canadian bosom, that before very long the U. M. W. of America would "reign from Sydney to Vancouver."

The P. W. A. is, however, not willing to be classed with the dinothereum or the dodo. Some happenings in Glace Bay recently proved this very effectively. The two representatives of the U. M. W. of America just referred to announced a public meeting in the King's Theatre at Glace Bay, to which they invited members of the P. W. A. to listen to the gospel of freedom as it is in Pennsylvania interpreted by a gentleman from Kansas, U.S.A. The P.W.A. for once descended from its perch of reposeful dignity and decided to make a "demonstration." When the U. M. W. A. detachment arrived they found the theatre filled to the doors with about 1,000 members of that effete body—the P. W. A. As many of the enemy as found it feasible squeezed themselves into the theatre, and then the fun commenced. Both sides entered a contest as to which could howl the loudest, and it may be said that the Cape Breton miner has a gift in this direction. A scene of confusion ensued, and for the space of two hours the crowd vied with the Ephesians of old, finally breaking up in disorder. The honors were decidedly with the vociferous powers of the P. W. A. men. The lungs of the non-native elements which constitutes the large majority of the U. M. W. A. supporters cannot cope with the brazen throats of men whose ancestors said good-morning to each other across a Highland glen. So they gave it up. The scene was not edifying, but it served to show how incensed the native unionists are becoming against the interlopers who have come unasked and certainly unwelcomed from the United States, with the avowed intention of causing trouble where peace did reign.

There was a large crowd in the streets of Glace Bay on this occasion, and so tense was the situation that very little would have caused an ugly row. It speaks well for the self-control of these men that no breach of the public peace took place, and it further serves to show how inborn is the sense of order in the Canadian citizen. It was a well-dressed crowd also. Speaking as one who has lived among and seen mining populations in several European countries, we are bound to admit that the native miner of Nova Scotia need fear no comparison, in dress, physique, speech or brains with his foreign brethren. We apologize for the term "native" but use it to distinguish between the Canadian born population and the new-comers. Where the European miner goes abroad in hob-nailed boots, with a scarf around his neck and a cap on his head, the Nova Scotian miner

is shod with trim boots, protected by "rubbers" or overshoes. He wears a starched shirt, a "Derby" hat, and would not dream of appearing in the streets without a collar. He speaks the King's English more or less correctly, not in the uncouth gibberish that passes current for English in some place we wot of.

To any person who knows the conditions that attend the miner's life in the United States and in Europe it is quite incomprehensible that Nova Scotian men should wish to put themselves under the thumb of an alien organization, who wish to make catspaws of them and nothing more. Seeing that conditions in Nova Scotia to-day are far ahead of conditions in the land which owns these self-styled saviours of the people, we fail to see how conditions will be improved here. Rather, would we think they will be dragged down to the level of less favored lands than our own.

Take for example, the recommendations made by the group of European mining experts which were lately called in by the U. S. Government to report on the prevention of mine explosions. These recommendations might have been adopted in toto from the accepted practice of Nova Scotian mines. Look at the record of life lost by explosions in Cape Breton during the past half-century. The two greatest disasters were the Caledonia explosion in 1899 and the Port Hood explosion in 1908, which together caused the death of twenty-one men. During the fifty years in question, Cape Breton produced between sixty and seventy million tons of coal, so that the percentage of lives lost by mine explosions cannot be called large.

It is not altogether a matter of safer mining conditions either. It is simply because mining in Cape Breton is conducted on proper lines, with due regard to the safety of the workers. And until they can do things better in Kansas or Pennsylvania we consider it is cheerful gall for any person to come from there and pretend to teach us anything that pertains to either the practice or the economics of mining.

We have once before referred to the utterances of a representative of the U. M. W. A. who in the rink at Glace Bay told an audience of miners that he knew they worked in ill-ventilated mines and were only half-fed: "it was plainly marked in their pallid faces." This gentleman came from British Columbia where the fatal accident rate among miners is twice as high as it is in Nova Scotia. What are people called who do not tell the truth?

**North Atlantic Collieries, Limited.**—The new shaft which has been sunk on the area leased by this company, reached the Blockhouse seam on the 27th of February. The seam in the new winning is 9 feet 6 inches in thickness. This seam is correlated by the Geological Survey as being equivalent to the Harbour on the Glace Bay side of the Morien anticline, but its thickness and general characteristics so resemble the Hub Seam that many people prefer to think it is the same seam. A peculiar feature of this seam was referred to in the Transactions of the North of England Mining Institute as long ago as 1871 by John Rutherford, namely the irregular shaped masses of shale which are met with in the body of the seam. Mr. Rutherford says: "This peculiarity consists of masses of shale which intercept the workings in a very singular manner. They are occasionally several yards thick, sometimes they are wedge-shaped, running to a point at the bottom of the seam, and are often of the most fantastic forms. From the fact of there being a bed of shale over-lying the coal, and also that in only one instance are they connected with the floor of the seam, it appears reasonable to infer that they have been thrust into fissures in the coal; but how these have been caused without disturbing the general shape of the beds is not so evident."



## QUEBEC.

**East Broughton.**—The Quebec Asbestos Company's property has been purchased by New York capitalists. Mr. Ling is president of the company which will be known as the Ling Asbestos Company. The Frontenac Asbestos Company have completed their mill and are now installing machinery. The Shawinigan Power line has been extended from Thetford Mines to East Broughton and will supply most of the power used at the mines.

**Black Lake.**—Mr. R. T. Hopper, of the Standard Asbestos Co., lately purchased from King Bros, Limited, lot 28, range 6, Ireland. The Q. C. Ry. Station and a considerable portion of the town are located on this property. The Imperial Asbestos Co. has taken up part of block "A" in Coleraine and propose building a mill in the early future. The property was bought from Mr. J. N. Greenshields, Montreal, who is the vice-president of the new company.

**Danville.**—The Asbestos and Asbestic Co., Limited, last year produced the largest tonnage in their history, approximating twenty thousand tons. A new mill is under construction which will increase the milling capacity by a half.

**Thetford Mines.**—Mining business has been very quiet here since the new year, and it is not probable that there will be much activity before the first of May. The building of new plants and enlargement of the old ones indicate a busy season. In 1894, at the close of a depression similar to the present, there was little latent confidence, while to-day there is a genuine boom in mining sales and exploitation. Messrs. W. Raleigh Kerr, J. A. Jacobs, and Mortimer Davis have purchased lot 28, range 6, Thetford, and are commencing at once to build a four "cyclone" mill. The company is called the Thetford Asbestos & Exploration Co. The Robertson Asbestos Co. are progressing favorably with the erection of their mill and hope to have it in operation in May.

## ONTARIO.

**Cobalt.**—One of the latest districts to attract the attention of the prospectors is the Township of Morel. Many hundreds of claims have already been staked and several good silver finds are reported. The new district is situated about thirty-seven miles to the northwest of Elk Lake, and in summer is accessible by canoe, on the east branch of the Montreal River.

The timber question in Gowganda has given rise to a great deal of dissatisfaction. Cutting timber is strictly prohibited by the Government, and offenders are being severely dealt with. The saw mill which was started some time ago has been forced to close down. The difficulties arise out of the fact that the discoveries are located in the Forest Reserve.

One of the most important finds of the year at Gowganda has recently been located on the Mann claim. The rich vein of the Boyd-Gordon has been traced to the former property and stripped for considerable distance. Excellent showings of native silver are reported to have been found.

A syndicate, composed of Detroit men, has purchased sixteen claims in Gowganda for \$50,000. A gang of twelve men has been sent up to do the assessment work.

The Bannell Sawyer, one of the big operators of the Larnder Lake Camp, has acquired the Milne property, known as T.R. 108, adjoining the Mann and Armstrong property in Gowganda.

On the claim owned by Col. Hay at the south end of Silver Lake, Montreal River District, a force of twenty men are engaged doing development work. On the 50-foot level of the old shaft, a drift is being driven on a 5-inch vein of calcite, carrying quantities of smaltite and niccolite.

The Toledo Mines Co. operating in the northwest corner of Tudhope Township, has purchased a plant consisting of a boiler, a six-drill Sullivan compressor, hoists, drills, etc., and at the mine everything is being put in readiness for the installation of the machinery, as soon as it arrives. A contract has been let for sinking a shaft 60 feet deep and as soon as the plant is in place this working will be taken over by the company. So far only temporary camps have been erected on the property.

The Bradshaw properties in the northwest corner of Tudhope Township will be operated by a company known as the United States Silver Mining Co. with a capital of \$1,000,000. A contract has been let to sink two shafts, each 100 feet in depth from the bottom of which drifting will be carried on. Permanent camps are being constructed and it is expected that machinery will shortly be installed.

The Big 6 Mining Co. recently sold four of their claims in the Miller Lake District to a syndicate. On their property adjoining the Motherlode Mine, considerable development work is being done. A shaft is down to a depth of 75 feet on a well-mineralized vein of calcite and a contract has been let to sink 25 feet more, at which depth drifting on the vein will commence.

There is great activity in the townships of Corkill, Brewster and Charters, Montreal River District. The recent discoveries at Calcite Lake have attracted the attention of a large number of prospectors. Several good discoveries are reported.

The system of leasing in this camp is rapidly gaining prominence, and the recent developments at Peterson Lake show that this method gives good results. The Little Nip, the Kerry Mining Co., and the Lucky Seven, are among the most important leasers, and the work done by the Lucky Seven, with the diamond drill has given such good results, that a small plant will probably be installed, and active development work carried on. The Kerry Mining Co., are still sinking on the 2½-foot niccolite vein discovered some time ago at a depth of about 95 feet. Sinking will be continued to the 150-foot level when drifting will commence. The vein has widened to 4 inches and carries good values.

The Bridge Syndicate, operating on Peterson Lake, have purchased a plant consisting of the following: One 100-h.p. boiler, the first half of an eight-drill compressor, a hoist, and three drills. The machinery has been shipped and will be installed early in March.

The Silver Mountain property has been leased to Mr. J. A. Jacobs.

Sinking is being carried on in the shaft of the Columbia Cobalt, which is under lease. The vein left the shaft at a depth of 30 feet, but the work will be carried on to the 75-foot level, where a cross cut will be run to tap the vein. If the values show up as well at the 75-foot level as at the 30-foot, a plant will be installed.

The North Cobalt Mine is under lease. A shaft will be sunk to a depth of 75 feet and then a cross-cut run, to cut the vein.

On the properties of the Holden Silver Mining Co., operating in Tudhope Township, the shaft is down over 90 feet and the company is carrying on the development work in a progressive manner.

The Empire Mining Co., which owns a number of claims in both Coleman and Lorraine, is doing active development work on their property in the latter township. A force of men are engaged in sinking the shaft which at the present time is down over 50 feet. The company expects to carry the shaft to a depth of 125 feet before any drifting is done. Several stringers of calcite are showing in the shaft. Good camps have been



erected and the equipment consists of one 35-h.p. boiler, a hoist and drill. It is probable that in the near future a compressor will be installed.

The new plant being installed by the Otisse Mine, Silver Lake, is expected to be in operation early in March. It consists of two 80 h.p. boilers, a nine-drill compressor, six drills, hoists and pumps. The total cost, including buildings, will be in the neighborhood of \$20,000. Two shafts are being sunk at a distance of 600 feet apart, and these will be connected by a cross cut, which is expected to cut a number of veins discovered on the surface. Cross cutting from the shafts will be commenced at a depth of 100 feet.

A force of thirty men are doing development work on the Hayden property. The shaft is now down over 70 feet and the vein varies in width up to 24 inches and carries silver values.

The W. J. Clerihue Syndicate, which owns eleven claims in South Lorraine, has recently ordered a plant which it is expected will be in operation about the first of April. It consists of a hoist and boiler sufficient to run two or three drills. A force of ten men are employed.

At the Davis fraction at Giroux Lake the shaft is down to a depth of 85 feet and is now being timbered. Three calcite veins are found in the shaft, two being one inch in width and the other 6 inches.

A curious accident occurred recently in the Columbus Mine, when drilling on the 250-foot No. 3 level. The men were drilling to cut No. 1 vein, when a subterranean body of water was encountered, which rushed with great force into the workings. The mine was promptly abandoned, and in an incredibly short time the water had drowned out the pump and risen to second level, where it was held in check by two station pumps. The next day the force of water grew less and it was soon under control. A few days after the men started to work again, but when the first round was taken out the water came in again with greater force than before, and everything had to be taken out of the mine. For the present all work has been stopped.

A strike of great importance was made recently at the Big Pete Mine of the Cobalt Central. A new silver vein was cut by the diamond drill 170 feet from the present workings of the third level of the mine, and at a depth of 410 feet from the surface. This is, with one exception, the greatest depth at which values have been found in this camp.

Fifty men are at present employed at the Chambers Ferland, and the work is being carried on in a very progressive manner.

The Red Jacket Mining Co. in Coleman, whose holdings were formerly known as the Morrisou property, are installing a plant consisting of a 100 h.p. boiler, an 8x10 hoist, a 6-drill compressor and three drills.

A cross cut is being run from the 175-foot level of the Rochester and the management expect to cut the vein shortly. The vein left the shaft at the 85-foot level, but no cross-cutting was done until the 175-foot level was reached.

Excellent progress is being made on the property of the Alexandria Mining Co. which adjoins the Bailey on the west. The main shaft is being sunk and is now down to a depth of 175 feet. Sinking will be continued to the 250-foot level, and from that depth diamond drill holes will be bored to test the surrounding country.

The new strike on the Silver Leaf is supposed to be a continuation of the main vein, which was worked last fall. The vein was cut off by a fault, and to the present the continuation had not been discovered.

A contract has been let to sink a shaft on the Farah property, adjoining the Nova Scotia.

The plant of the Colonial mine is being moved to the property of the Temagami Cobalt Silver Mining Co., under the

supervision of Mr. Somers, mechanical engineer for this company.

It is said that Cobalt is to have a custom sampler, the plans of which are now being prepared. The work of installation will commence in the near future. The sampler will fill a long-felt want, as a lack of proper sampling facilities has proved to be a serious handicap in handling the class of ores which are encountered in this camp.

The new shaft of the Ontario Development & Mining Co., in the first concession of Coleman, is down fifty feet.

It is expected that the new plant being installed by the Kerr Lake Majestic will be in operation shortly.

A small surface plant is to be installed by the Quaker City Mining Co., close by the Temiskaming. A force of 20 men are at work on the property.

The Hydraulic Co. have purchased more drills, and are carrying on their operations in a progressive manner. They expect to be able to supply air and electricity by next July.

On February 25th the Kerr Lake discovered a new vein 10 inches wide, carrying 6,000 oz. of silver. The negotiations between the Kerr Lake and the Hargraves for the use of one of the shafts of the former company to develop the Hargraves property, are still pending.

A rich vein of ore one inch wide was discovered in No. 2 cross-cut of the Crown Reserve, which runs almost parallel to the cross-cut. Returns of ore shipped in the month of January show a value of \$175,000. One hundred and thirty men are working at the mine.

A new strike, 3 feet wide, and carrying good values, was made on March 2nd at the Chambers-Ferland. The car of high-grade ore now at the Denver smelter shows exceptionally high values.

G. C. Brewer, of Cobalt, has secured the contract for transporting the Bartlett mining machinery to Gowganda. There will be 25 teams at work on the job. The contract price is \$12,000.

The Town of Cobalt has decided to appeal against the decision of the High Court in regard to the litigation of the Coniagas mine.

## BRITISH COLUMBIA.

**Roseland.**—Mining is a little quiet in this district at the present time, as the full working force has not yet been put back into the Le Roi since the recent shut-down. During the week ending February 20th the Le Roi shipped 1,295 tons of ore, the Centre Star group 3,580, and the Le Roi 2, Ltd., 455 tons. Work at the smaller mines and leases is not as active as it may be a little later on in the season, as at the present time there is a lot of water to contend with in many of these smaller properties, and adequate pumping facilities are not always on the ground.

A few weeks ago the Mugwump Mining Co. breathed its last, the affairs of the company having been wound up by A. B. Mackenzie, liquidator. One stockholder who owned 100 shares that he bought thirteen years ago, expecting to make a handsome profit on his investment, received 15 cents for his holdings. The Mugwump claim, which it is expected will some day prove to be a valuable property, was bought in by the Consolidated Co. for \$2,000; of this sum \$520.63 was eaten up with the legal expenses, leaving \$493.83 to divide among the stockholders.

**Nelson.**—The Star Mining & Milling Co., of Sandon, in its action against the Byron N. White Co., has again been awarded the decision, in this case by the Supreme Court of Canada. This case, which lately involved a question of apex rights, of much importance to Slocan miners, was begun in 1901 for trespass by



the taking of ore, for an injunction and damages. While no definite action has yet been taken by the White Company in the matter, it is probable that the case will be taken before the Privy Council, as both sides are most positive that they are in the right, and feel as though the case should be fought to a finish.

One of the successful Cobalt mining men, Mr. Jas. McMartin, president of the La Rose Consolidated Mining Co., has been interested by J. L. Warner in the Mother Lode group on Sheep Creek, the Kootenay Belle also being included in the deal. Extensive development work will be done on the property acquired and the mines placed on a heavy producing basis. The Kootenay Belle adjoins the Queen mine, which to date has paid nearly half a million dollars to its operators.

A bond has been taken on the Yukon claim in the Ymir district by H. L. Rodgers, of Spokane, who some time ago acquired the American Girl and Canadian Girl claims. The price at which the Yukon has been acquired is said to be \$35,000, 10 per cent. of which was paid upon the signing of the papers.

The Central Mining Co., and the Scranton Coal Mining Co., operating near Lethbridge, have been consolidated, and will work on a larger scale in the future. The property is at present producing about 500 tons of coal per day, but this output is to be increased to 800 to 1,000 tons per day in the immediate future.

The ore body recently opened up on the Independence group, Sheep Creek, has widened to about 20 inches, and is looking much better as the work proceeds. This ore ought to run about \$185 per ton, judging from what has been shipped heretofore.

An 8-foot ledge was cut on the Queen during the past week that will give an average of \$43 per ton. This property continues to mill its weekly quota of 420 tons of second-class ore, and makes shipments of the higher class of ore at regular intervals.

The Le Roi 2, Ltd., Rossland, has declared a dividend of two hillings per share. It is understood that this is to be taken in the nature of a quarterly dividend, and that others will be forthcoming at the proper time. The Le Roi 2 certainly makes good showing for a property working on such a small scale in low-grade ore, comparatively speaking, of course.

At the Second Relief, Erie, the company milled 145 tons of ore during the past week. Shipments are being made to Northport smelter, and the mine is looking fairly well.

The big stamp mill at the Blue Bell continues to work steadily and treat its 900 tons of lead-zinc ore per week. The company has crushed 5,900 tons of ore so far this year, and has sent out nearly 600 tons of crude ore besides.

The Molly Hughes, Yankee Girl, Silver Hustler, Silver Glance and other light shippers of the district have already appeared on the shipping list.

At the Aurora, on Moyie Lake, the operators are meeting with much success. The ore is coming in at several levels, and there is a quantity of good shipping ore on hand that will be sent out at an early date.

Milling at the Whitewater is going on steadily at the rate of about 700 tons per week. The company has treated nearly 5,000 tons of ore so far this year.

**Phoenix.**—During the week ending Feb. 27th, the shipments from Boundary amounted to 31,544 tons, the Granby shipping 21,397, Mother Lode 7,800, Oro Denoro 155, and Snowshoe 2,170 tons.

The formation of the Osoyoos Mining Co., to take over and work 1,920 acres of coal lands in the Similkameen valley, is announced. Those interested recently bored a test hole over 800 ft., cutting over 50 feet of coal. The coal found in this locality is a good quality of bituminous fuel.

The Sacramento claim, near Hedley, is about to be worked again. Development will be pushed for some time.

The report of the British Columbia Copper Co. for the fiscal year ending Nov. 30, 1908, shows that the company mined, refined and sold its copper during the last seven months of operation at a cost of 9.996 cents. The cost per ton of ore handled was \$2.6322. The total earnings of the company during the fiscal year were \$1,086,635; ores sold, etc., \$13,324, making a total of \$1,099,959. From this was written \$899,475 for expenses, maintenance, etc., and \$106,793 for decrease in the market value of metal unsettled for Nov. 30, 1907, and expenditure during the suspension of operations from Dec. 1, '07, to April 30, '08, leaving a net profit for the year of \$93,691. The surplus shown at this time is \$269,732. The showing is good, and it is gratifying to see that by the co-operation of the different departments of the company the price of producing its copper was kept down to the low figure of 9.996 cents, which augurs well for the future.

**Vancouver.**—The Government has introduced a bill making several minor amendments to the Mineral Act. Section 8 is being changed, elucidating the point of mining without a miner's license. The question of the share of a partner or co-owner who has allowed his free miner's license to lapse will also be simplified. Section 36, regarding the securing of a certificate of improvement prior to the issuing of a Crown grant, will be amended to provide that prior to obtaining a Crown grant a certificate of improvement will be obtained from the Gold Commissioner, and prior to that a certificate of work from the mining recorder. The life of a certificate of work in future will be but three months, if this bill is passed, when the provision will come into force April 1, 1910. A further minor change will be the charging of a fee of \$10, instead of \$5, for the issuing of a Crown grant to surface rights of mineral claims.

The property of the Mountain Boy group on American Creek at the head of Portland Canal has been bonded by T. Hopkins, of Seattle, who has a number of American capitalists behind him. The group of four claims has been taken over at a figure in the neighborhood of \$125,000. Mr. Hopkins has also secured control of the charter of the Portland Canal Mining Co., which embodies valuable railway privileges, and it is the intention to build a railway under this charter from the town of Stewart to the mines on American Creek.

## GENERAL MINING NEWS.

### ONTARIO.

**Kingston.**—The annual meeting of the Eastern Ontario section of the C. M. I. was held in the School of Mining, Kingston, Thursday, Feb. 25th, the president, Prof. J. C. Gwillim, in the chair.

The election of officers for the ensuing year resulted as follows: President, Prof. J. C. Gwillim; Vice-President, Prof. M.

B. Baker; Secretary-Treasurer, John Donnelly, M.E.; Assistant Secretary-Treasurer, E. H. Birkett.

The following papers were read and discussed: "The Wilbur Iron Ore Deposit," by S. King; "Diamond Drill Methods as Practised in the Michigan Iron Ore Range," by J. K. Osborne; "Summer Experiences of an Undergraduate," by F. Ransome. Two other papers, entitled "The Diabase and



Aplite of the Cobalt Silver District," by N. L. Bowen, and "The Chromiferous Peridotites of Lake Abitibi District," by H. T. White, were to be read, but owing to the lateness of the hour it was decided to leave this over till next meeting.

A vote of thanks, on motion of Dr. Goodwin, seconded by Mr. Donnelly, was tendered to the students presenting the papers, and the meeting adjourned.

The Queen's branch of the C. M. I. is to be congratulated on its increased membership, having increased in the last year from 47 to 87. It is expected that a large number of the local branch will attend the annual meeting of the Institute, which is to be held in Montreal.

**Cobalt.**—One hundred and eight veins have been found on Nipissing. Three hundred and ten men are employed, and there are 20,000 feet of underground development work.

A three-inch vein in wall rock has been found at the 100-foot level in the Silver Leaf.

While cross-cutting at the 250-foot No. 3 level at the Columbus mine the men drilled into No. 1 vein and struck a submarine lake. Within a few hours the water reached No. 2 level at 150 feet. The company put four pumps at work, but they could not cope with the water, and the mine is for the present idle.

A miner named Boyes, an employee of the Nipissing mine, was sentenced in Cobalt Police Court to eighteen months in the Central Prison for high-grading.

Two hundred and fifty men and 18 drills are working at La Rose, and 250 men and 17 drills at Nipissing.

The Fourth of July shaft at the Nipissing is now down 165 feet. During February \$75,000 worth of ore was taken from shaft-sinking alone. In one day 564 sacks of ore were brought up.

The timbering of the Badger main shaft is almost completed. Rich ore is being taken out at the 100-foot level, calcite and native silver. The main shaft is now down 225 feet. Seventy-five men are at present employed.

Three new veins have been discovered at the 100 and 150 foot levels of Kerr Lake mine, with a total width of 35 inches.

The action of William Armstrong, in which he claimed one-sixth interest in the Lawson mine, has been dismissed.

Thirteen veins have been found on the territory of the Cobalt Station Grounds Mining Co. Four veins are to be cross-cut on the McKinley-Darragh side. Towards the north, near the Right of Way several veins are expected to be cross-cut.

**Gowganda.**—Trouble is feared over the location of the Gowganda townsite. At first the Government located the townsite in a place at Gowganda Lake where prospectors claim three feet of water will be found in the slough in the spring. The new townsite, as proposed, will be on better grounds, but many who claim to be in possession of the facts say the Government is trying some scheme which makes those interested feel that they will have to abandon their rights to make room for the new townsite.

It is most regrettable that with so much money waiting to be spent in Gowganda, as well as the enormous sums already spent, the matter of a townsite could not have been permanently settled some time ago.

**Elk Lake.**—A new ore-chute has been opened up at the Mother Lode mine, showing a vein of high-grade ore about 12 inches wide.

Three drills are being operated at the Otisse-Currie, and the shaft is down to the 60-foot level, from which level drifting has been commenced. The following buildings have been erected: Powerhouse, 30x40 ft.; office, cookhouse, sleeping camp, pump-house and stable. Forty men are at present employed.

**Fort William.**—A strike of gold ore has been made near Sturgeon Lake on the Grand Trunk Pacific. A stampede is expected as soon as the weather moderates.

## ALBERTA.

**Edmonton.**—M. J. O'Brien, of Renfrew, Ont., has formed the Yellowhead Pass Coal & Coke Co., Ltd., which will commence this summer the development of a hard bituminous coal field west of Edmonton. The coal property embraces an area of 5,120 acres. It is situated 24 miles southwest of the G. T. P. where it crosses the Macleod River. The coal has the same appearance as the bituminous coal of the Crow's Nest Pass. The preliminary work of uncovering the coal seams will be begun in August, but actual mining will probably not take place before the summer of 1910.

**Pincher.**—There are five veins averaging eight feet in width on the property of the Pincher Creek Coal Co. The holdings consist of 1,200 acres. The miners are down 150 feet, three shifts sinking an incline shaft. Between 300 and 400 tons of coal will be shipped daily before the end of next summer.

**Lethbridge.**—The South Alberta Irrigation Co. struck a flow of seven million cubic feet of natural gas per day at Bow Island at a depth of less than two thousand feet.

## BRITISH COLUMBIA.

**Fernie.**—The Crow's Nest Pass Coal Co. intend doing a large amount of building in the near future. It is intended to build 1,000 more coke ovens, and other improvements are to be made.

At Michel the Crow's Nest Pass Coal Co. are daily producing 1,800 tons of coal and 750 tons of coke.

**Hosmer.**—The new collieries of the C. P. R. began the shipment of coal and coke on December 19th, 1908. Two hundred and forty beehive coke ovens, with a daily capacity of 300 tons, are in use.

**Rossland.**—The Republic mine, sold some time ago for taxes, is to be reopened. The new Republic Company will take over the property and franchises of the Republic Light and Water Company. The facilities will be improved and the surplus power used in driving the machinery, which is now en route from the East.

Active mining will start in the winze as soon as the hoisting plant is installed. To exhaust the ore now in sight will take at least two years of steady operation. One car of ore has already been sent to the smelter.

Preparations are being made to increase the output of the Granby smelter. The furnaces are being enlarged from 18 to 22 feet in length, and the capacity of the converter plant for producing blister copper has been increased to 36,000,000 pounds per annum.

**Moyie.**—Three feet of crude ore has been struck in No. 3 raise off the main tunnel in the Aurora mine. An 18-inch vein has also been found in the main tunnel, which has now been driven a distance of 450 feet.

**Nelson.**—The Blue Bell is shipping at the rate of nearly 700 tons a month, and receiving substantial bounty benefit.

The Canadian Zinc Co. are reorganizing on a larger capital basis to give the company a larger scope for operations and the purchase of ores.

The 8-inch paystreak of the Independence mine at Shee Creek in the west drift of the new lower level has widened to twenty inches.

An 8-foot streak was found on the Queen mine, showing a average assay of \$43 gold per ton.



Three of the five lower levels of the Silver King have been unwatered. Four machine drills are now in operation, and 26 men are employed.

The Consolidated Mining & Smelting Co., of Trail, have taken a two and a half year bond on the Queen Victoria mine. The mine is equipped with the most modern machinery, and shipments of ore to the Trail smelter will begin immediately.

**Ymir.**—H. L. Rodgers, of Spokane, who recently took bonds on the Canadian Girl and American Girl mines, has secured possession of the Yukon property. The Yukon adjoins the American Girl, and the intention is to combine the two properties. The price paid was \$35,000.

**Vancouver.**—The Nuba and Early Bird Mining Companies will jointly install a 20-stamp mill on their claims at Gold Harbor on the west coast of Moresby Island, Queen Charlotte Islands. The order for the plant has been placed in Germany.

The Nuba Company owns fifty-four claims near Gold Harbor. Twenty men have been engaged at development work since last autumn.

At Rose Spit, Queen Charlotte Island, preparations are under way for prospecting and working the black sand in that vicinity.

**Victoria.**—The Government has introduced a bill for the amendment of the Mineral Act. Section 8 is amended by making clearer the penalty for mining without a miner's license.

Another change is simplification of the proof required to vest in man the share of a partner or co-owner who has allowed his free miner's license to lapse.

Section 36, regarding the obtaining of a certificate of improvements prior to the issuance of a Crown grant, is amended to provide that prior to obtaining a Crown grant a certificate of improvement or improvements has to be obtained from the Gold Commissioner, and prior to that again a certificate of work from the Mining Recorder. In future the life of the certificate of work will be but three months. This provision is not to come into force until April 1st, 1910.

Another minor change is the charging of a fee of \$10, instead of \$5, for the issuance of a Crown grant of the surface rights of a mineral claim.

## MINING NEWS OF THE WORLD.

### GREAT BRITAIN.

The coal owners have applied to the Coal Conciliation Board for the federated mining districts in England and North Wales for a 5 per cent. reduction in the existing rate of wages. The Board could come to no agreement on the subject, so the matter was referred to Lord James of Hereford, the independent chairman, for his casting vote.

The Board of Trade returns for the month ending January 31st, 1909, are: Tin—Imports 3,564 tons, value £465,702; exports, 993 tons, value £129,975. Copper—Imports, metal, 8,180 tons (£502,894); ores, 7,727 tons (£75,150); exports, 2,870 tons (£196,673). Lead—Imports, 18,613 tons (£246,694); exports, 2,765 tons (£45,084).

### GERMANY.

An amalgamation of German zinc works, with the co-operation of a large number of Belgian, French, Dutch and Austrian zinc firms, has been completed in Berlin, under the title of the Zinc Smelters' Association, Limited, with a capital of 2,047,000 marks. The basis for an international agreement with other European spelter firms has already been arranged.

### RUSSIA.

The latest figures available concerning asbestos production show that there were 25 mines in operation, employing 1,900 men, and the output amounted to 15,970,285 lbs. The mines are in the Ural Mountains, in the Province of Perm, also in the Altai Mountains of Siberia.

### INDIA.

With a view to encouraging the study of mining, the Government of Bengal, East Bengal and Assam intend to give scholarships to students, who will study the subject in the Shibpur Engineering College.

### AUSTRALASIA.

The tin mines of Tasmania employed during the last quarter of 1908 a total of 1,747 men, 1,461 of whom were Europeans and the balance Chinese.

The gold productions of the various states for January are as follows: Queensland, 24,500 oz., or \$506,415; Victoria, 40,848 oz., or \$844,328; Western Australia, 132,267 oz., or \$2,713,959; New South Wales, 19,885 oz., or \$411,023.

The mineral production of New South Wales for the year 1908 is valued at £8,609,607, including £954,854 for gold, £2,947,824 for lead and silver, £502,812 for copper, £205,447 for tin, £3,353,093 for coal. The coal production was 9,147,028 tons.

### SOUTH AFRICA.

The Natal Government has appointed a commission to revise the mining laws of the colony; to advise as to the best means of encouraging and assisting the development of the mineral resources of the colony, especially in regard to gold and base metals, and to advise as to the necessity for reorganizing the Mines Department.

The output of Cassiterite in the Transvaal for 1908 was 1,427 tons, of a total value of £97,188. Practically the whole of this has been mined from the Waterbury district.

The scheme for supplying the Rand mines with electric power provides for many of the mines using this power by the beginning of next year. In order to do this it will be necessary to convert their present steam plants to electric working installations.

### WEST AFRICA.

The West African Chamber of Mines states that the gold yield of the colony for January was 22,817 oz., valued at £91,112, a decrease of 1,807 oz., or £7,150 compared with the preceding month.

### UNITED STATES.

Goldfield, Nevada, has been selected as the place for the next annual convention of the American Mining Congress.

According to the Bureau of Statistics, in the Department of Commerce and Labor, the value of copper and manufactures of copper exported during December was \$6,958,710, which compares with \$11,337,544 in corresponding month of year previous. The total copper exported during 1908 amounted to \$90,555,503, as compared to \$100,800,355 in 1907.

The Calumet and Hecla's regrinding plant is showing excellent results in the saving of copper heretofore lost in the tailings. With the plant in full operation a saving of 3,000,000 lbs. of copper annually will be made at a cost of about 12 cents per lb.

It is expected that the placer gold output of Oregon for 1908-9 will be the greatest in years. Every mine is in full operation, and the rains have been heavy and unbroken.

#### MEXICO.

Owing to the unsatisfactory conditions in the metal markets, which have resulted in the shutting down or the short time

working of many Mexican mines, the smelters of the American Smelting and Refining Company are working on half time. The scarcity of silicious ores in Mexico is being felt by metal reduction works.

There has been an increased demand for zinc ores since the recent decision of the U. S. Court of Appeals making carbonate ores and calomine free of duty in their importation into the United States.

Oil will soon replace coal as fuel in all the mine power-houses of the Cananea Copper Co., the misunderstanding with the Federal Government as to the scope of the concession having been adjusted about a month ago.

## COMPANY NOTES.

At the annual meeting of the Dominion Coal Company, called for March 4th, an adjournment will be made to a later date for the transaction of the business of the meeting. The directors of the Dominion Coal Company, Limited, have made an offer to the Dominion Iron and Steel Company, Limited, covering the settlement of pending litigation. It is deemed advisable to await the reply of the Dominion Iron and Steel Company, Limited, before proceeding with the business of the annual meeting of the Dominion Coal Company, Limited, in order that a complete and more definite statement than is now available may be presented to the shareholders.

#### "SCOTIA" PFD. DIVIDEND.

Nova Scotia Steel directors have declared the quarterly dividend of 2 per cent. on the preferred stock, payable April 15.

#### INTERCOLONIAL COAL ANNUAL.

The annual meeting of the shareholders of the Intercolonial Coal Mining Company, Limited, took place in Montreal, March 3rd. The output of coal and coke for the year amounted to 310,198 tons.

The following were elected directors: Messrs. James P. Cleghorn, W. M. Ramsay, R. MacD. Paterson, K. W. Blackwell, E. Goff Penny, D. Forbes Angus and Duncan Robertson.

At a subsequent meeting of the Board the old officers were re-elected.

Mr. Duncan Robertson is an addition to the Board since last year.

#### ANOTHER DIVIDEND.

The Temiskaming & Hudson Bay Co. has declared another \$3 dividend, or at the rate of 300 per cent., making total dividends since its inception 12,400 per cent.

#### POSITION OF LA ROSE.

From June 1st to December 31st, 1908, La Rose produced 1,764,146 ounces silver, and made net profits of \$650,566. It has paid two dividends, one of 3 per cent., on October 20th, 1908, and one of 3 per cent., with a bonus of 1 per cent., on January 20th, 1909.

It will be seen that in seven months' operations La Rose has very nearly earned its entire dividend requirements for one year on a 12 per cent. basis.

Its present known ore reserves—by far the largest in Cobalt—are sufficient for dividend requirements on this basis for five years to come.

Cobalt has produced since its discovery 48,678 tons of ore. The La Rose mine has shipped 9,483 tons of ore, or nearly 20 per cent. of the total production of the camp.

January net earnings of the La Rose Company amounted to \$90,000. Net earnings for the eight months ended January 31 amounted to \$739,584, out of which two regular and one extra dividend was declared, calling for the total payment of \$420,000, leaving surplus earnings of \$319,584.

#### COBALT LAKE MEETING.

The annual meeting of the Cobalt Lake Mining Co. was held at Ottawa, February 27th.

The consulting engineer, Mr. E. L. Fralick, said no very hopeful outlook as to prospects could be held out; but there was a possibility of soon striking the McKinley-Darragh vein, toward which they have been working for some time.

The financial statement for the year showed the working expenses to have been \$142,554.56, while the proceeds were \$83,547.14, which included interest, transfer fees, ore sales and ore on hand, leaving a balance at debit of profit and loss of \$59,007.42. Adding the balance from 1907, \$132,776.20, to this, the balance at debit of the profit and loss account December 31st, 1908, amounts to \$191,783.62.

The consulting engineer, Mr. E. L. Fralick, reported that 3,272 feet of work had been done during the year, comprising 3,138 feet of drifting and cross-cutting and 134 feet of sinking. In addition, 18,000 cubic feet of stoping had been done. According to Mr. Fralick, the past year has seen the end of the dead work, and every one of the machines is driving in conglomerate or Huronian slate.

The report of Mr. D. B. Rochester, managing director, contains some interesting information. The mine has been operated without interruption, except for a few days, with an average of 60 men. Most of the underground work done has not met with much success, so far as discovering silver is concerned. This is probably owing to the formation existing on the east side of the lake from the centre to the south end, where most of the work has been done. It is hoped that the McKinley-Darragh and Right of Way veins will be encountered shortly. Owing to the property being under water this is probably the most expensive property to work in the camp.

Mr. D. B. Rochester, the managing director, was formerly paid \$4,000 per year, but owing to the amount of criticism he resigned and a new arrangement was made whereby Mr. Rochester was to be paid \$200 per month. Mr. Rochester was to give all the time necessary to Cobalt Lake Mining Co., but was to have permission to engage in other business in his spare time.

The old Board of Directors was re-elected as follows. President, Sir Henry M. Pellatt; Vice-President, Geo. F. Henderson, K.C.; Directors, M. Marehand, John H. Avory, Major J. A. Murray, Thos. Birkett, Gordon C. Edwards, Dr. C. Cousens and D. B. Rochester.



Letters patent have been granted to the Crown Exploration and Development Company, Limited, Montreal, with capital stock of one million dollars. The provisional directors are mostly leading figures in the Crown Reserve Mining Company, namely, Robert Reford, John Carson, W. I. Gear, Peers Davidson and James Cooper.

RIGHT OF WAY ANNUAL MEETING.

At the annual meeting of the Right of Way Mining Co., Limited, it was decided to pay a quarterly dividend of 6 per cent., together with a bonus of 9 per cent., payable on April 1. Books close on March 22 and reopen April 1.

NANCY HELEN ANNUAL MEETING.

The directors and stockholders of the Nancy Helen met at the mine office. W. R. Smyth, M.P., was elected President;

Shirley Ogilvie, of the Ogilvie Milling Co., was elected Vice-President; J. A. Hutton, merchant, Thornton, Ont., a director, and William Black, Secretary-Treasurer. The directors were empowered to lease or deal with the 40-acre lot in Bucke Township belonging to the company in any way advantageous to the company.

TEMISKAMING DIVIDEND.

The directors of the Temiskaming Mining Company have declared the regular quarterly dividend, which will be paid on April 1. It finally disposes of the rumors to the effect that this company would pass its dividend this quarter.

A quarterly dividend of two shillings per share has been declared by the Le Roi No. 2 Mining Company, payable on March 11th.

STATISTICS AND RETURNS.

NOVA SCOTIA STEEL OUTPUT.

The coal output of the Nova Scotia Steel Company amounted to 55,667 tons for February. The company has about fifty thousand tons on the bank, which will be increased. The pig iron output was 5,000 tons, and the product of the steel plant slightly above that figure. All departments are in satisfactory operation.

CUMBERLAND COLLIERIES.

The shipments from the collieries of the Cumberland Railway and Coal Company for the month of February were 27,191 tons.

STEEL COMPANY OUTPUT.

Dominion Iron & Steel Company's output for February is as follows: Pig iron, 20,200 tons; steel, 22,500 tons. Total shipments, about 20,000 tons.

DOMINION COAL OUTPUT.

The output of the Dominion Coal Company's collieries last month was 207,328 tons. The shipments were 119,646 tons. The output in January was 195,971 tons. In February of last year the output was 282,508 tons, and for February, 1907, the figures were 226,490 tons.

Considering that February was a short month, the output shows a satisfactory improvement over January. The February output in detail was as follows:—

|                   |         |
|-------------------|---------|
| No. 1, Dominion   | 40,298  |
| No. 2, Phalen     | 40,127  |
| No. 3             | 12,924  |
| No. 4, Caledonia  | 29,210  |
| No. 5, Reserve    | 40,527  |
| No. 6, Donkin     | 1,250   |
| No. 7, Hub        | 9,065   |
| No. 8, Bridgeport | 13,428  |
| No. 9, Bridgeport | 20,359  |
| Total             | 207,328 |

CROW'S NEST PASS OUTPUT.

The output of the Crow's Nest Pass Company's collieries for the week ending February 26th was 15,785 tons, a daily average of 2,631 tons. The output of the Crow's Nest Pass Company's collieries for the week ending March 5th was 14,940 tons, a daily average of 2,190 tons.

COBALT ORE SHIPMENTS.

Following are the weekly shipments from Cobalt camp, and from Jan. 1, 1909, to date:—

|                | Week end.<br>Feb. 20.<br>Ore in lbs. | Since<br>Jan. 1.<br>Ore in lbs. |
|----------------|--------------------------------------|---------------------------------|
| Buffalo        | 44,730                               | 133,010                         |
| Crown Reserve  | 103,590                              | 698,800                         |
| City of Cobalt | 60,000                               | 330,930                         |
| La Rose        | 258,730                              | 2,008,290                       |
| Nipissing      | 256,481                              | 1,564,603                       |
| Right of Way   | 182,580                              | 372,595                         |
| Temiskaming    | 60,000                               | 370,000                         |
| T. & H. B.     | 60,000                               | 384,060                         |

Ore shipments to Feb. 20, 1909, are 7,791,057 lbs., or 3,895 tons. Total shipments for week ending Feb. 20 were 1,086,250 lbs., or 542 tons.

|                  | Week end.<br>Feb. 27.<br>Ore in lbs. | Since<br>Jan. 1.<br>Ore in lbs. |
|------------------|--------------------------------------|---------------------------------|
| Buffalo          |                                      | 133,010                         |
| Coniagas         |                                      | 271,905                         |
| Crown Reserve    | 296,900                              | 905,700                         |
| Cobalt Central   | 40,375                               | 121,755                         |
| Chambers-Ferland |                                      | 142,000                         |
| City of Cobalt   | 60,000                               | 390,930                         |
| Kerr Lake        |                                      | 205,097                         |
| King Edward      |                                      | 53,920                          |
| La Rose          | 259,050                              | 2,267,340                       |
| McKinley-Darragh |                                      | 308,080                         |
| Nipissing        | 212,675                              | 1,777,278                       |
| Nova Scotia      |                                      | 401,390                         |
| Nancy Helen      |                                      | 40,000                          |
| Peterson Lake    |                                      | 81,560                          |
| O'Brien          |                                      | 127,880                         |
| Right of Way     | 122,490                              | 495,085                         |
| Silver Queen     |                                      | 65,000                          |
| Temiskaming      |                                      | 370,000                         |
| Trethewey        | 65,000                               | 342,930                         |
| T. & H. B.       |                                      | 384,060                         |
| Muggley Cons.    |                                      | 72,900                          |

Ore shipments to Feb. 27, 1909, are 8,847,547 lbs., or 4,423 tons. The total shipments for week ending Feb. 27 were 1,056,490 lbs., or 528 tons.

**BRITISH COLUMBIA ORE SHIPMENTS.**

The following are the shipments for the week ending Feb. 19th, and year to date in tons:—

**Boundary Shipments.**

|                       |        |         |
|-----------------------|--------|---------|
| Granby . . . . .      | 18,672 | 133,356 |
| Snowshoe . . . . .    | 4,188  | 21,421  |
| Mother Lode . . . . . | 8,684  | 64,608  |
| Oro Denoro . . . . .  | 248    | 1,898   |
| Sally . . . . .       | 20     | 41      |

|                 |        |         |
|-----------------|--------|---------|
| Total . . . . . | 31,812 | 221,324 |
|-----------------|--------|---------|

**Rossland Shipments.**

|                                |       |        |
|--------------------------------|-------|--------|
| Le Roi No. 2, milled . . . . . | 260   | 1,560  |
| Centre Star . . . . .          | 3,994 | 15,716 |
| Le Roi No. 2 . . . . .         | 547   | 4,141  |
| Le Roi . . . . .               | 1,057 | 5,370  |
| Other mines . . . . .          | ..... | 92     |

|                 |       |        |
|-----------------|-------|--------|
| Total . . . . . | 5,858 | 26,879 |
|-----------------|-------|--------|

**Slocan-Kootenay Shipments.**

|                 |       |        |
|-----------------|-------|--------|
| Total . . . . . | 3,589 | 23,066 |
|-----------------|-------|--------|

The total shipments for the past week were 41,225 tons, and for the year to date 271,235 tons.

**Granby Smelter Receipts.****Grand Forks, B.C.**

|                        |        |         |
|------------------------|--------|---------|
| Granby . . . . .       | 18,672 | 133,356 |
| Others mines . . . . . | .....  | 85,580  |

|                 |        |         |
|-----------------|--------|---------|
| Total . . . . . | 18,672 | 219,036 |
|-----------------|--------|---------|

**B. C. Copper Co.'s Receipts.****Greenwood, B.C.**

|                       |       |        |
|-----------------------|-------|--------|
| Mother Lode . . . . . | 8,684 | 57,301 |
| Oro Denoro . . . . .  | 248   | 1,898  |
| Snowshoe . . . . .    | 1,950 | 5,800  |

|                 |        |        |
|-----------------|--------|--------|
| Total . . . . . | 10,882 | 64,429 |
|-----------------|--------|--------|

**Consolidated Co.'s Receipts.****Trail, B.C.**

|                 |       |        |
|-----------------|-------|--------|
| Total . . . . . | 7,759 | 40,106 |
|-----------------|-------|--------|

**Le Roi Smelter Receipts.****Northport, Wash.**

|                       |       |       |
|-----------------------|-------|-------|
| Le Roi . . . . .      | 1,057 | 5,370 |
| Other mines . . . . . | 329   | 2,109 |

|                 |       |       |
|-----------------|-------|-------|
| Total . . . . . | 1,386 | 7,479 |
|-----------------|-------|-------|

The total smelter receipts from the various mines for the past week were 38,699 tons, and for the year to date 133,950 tons.

The following were the ore shipments for the week ending Feb. 26th and year to date in tons:—

**Boundary Shipments.**

|                       |        |         |
|-----------------------|--------|---------|
| Granby . . . . .      | 21,397 | 154,793 |
| Mother Lode . . . . . | 7,800  | 72,408  |
| Oro Denoro . . . . .  | 155    | 2,053   |
| Snowshoe . . . . .    | 5,275  | 28,696  |
| Other mines . . . . . | .....  | 41      |

|                 |        |         |
|-----------------|--------|---------|
| Total . . . . . | 31,522 | 252,886 |
|-----------------|--------|---------|

**Rossland Shipments.**

|                                |       |        |
|--------------------------------|-------|--------|
| Centre Star . . . . .          | 2,752 | 18,468 |
| Le Roi No. 2 . . . . .         | 485   | 4,606  |
| Le Roi No. 2, milled . . . . . | 260   | 1,820  |

|                 |       |        |
|-----------------|-------|--------|
| Total . . . . . | 3,497 | 31,916 |
|-----------------|-------|--------|

**Slocan-Kootenay Shipments.**

|                 |       |        |
|-----------------|-------|--------|
| Total . . . . . | 4,503 | 27,575 |
|-----------------|-------|--------|

The total shipments for the week were 39,522 tons, and for the year to date 312,377 tons.

**Granby Smelter Receipts.****Grand Forks, B.C.**

|                       |        |         |
|-----------------------|--------|---------|
| Granby . . . . .      | 19,029 | 152,485 |
| Other mines . . . . . | .....  | 85,580  |

|                 |        |         |
|-----------------|--------|---------|
| Total . . . . . | 19,029 | 138,065 |
|-----------------|--------|---------|

**B. C. Copper Co.'s Receipts.****Greenwood, B.C.**

|                       |       |        |
|-----------------------|-------|--------|
| Mother Lode . . . . . | 7,800 | 65,101 |
| Oro Denoro . . . . .  | 155   | 1,483  |
| Snowshoe . . . . .    | 2,170 | 7,970  |

|                 |        |        |
|-----------------|--------|--------|
| Total . . . . . | 10,125 | 74,554 |
|-----------------|--------|--------|

**Consolidated Co.'s Receipts.****Trail, B.C.**

|                 |       |        |
|-----------------|-------|--------|
| Total . . . . . | 7,786 | 46,998 |
|-----------------|-------|--------|

The total smelter receipts for the past week are 36,940 tons, and for the year to date 239,720 tons.

**RAND GOLD OUTPUT.**

The Rand gold output in February, as estimated in London, was 640,000 ounces. Comparison of value of the month's output is:—

|                          |              |
|--------------------------|--------------|
| February, 1909 . . . . . | \$13,600,000 |
| January, 1909 . . . . .  | 13,064,000   |
| December, 1908 . . . . . | 14,031,000   |
| November, 1908 . . . . . | 13,048,000   |
| October, 1908 . . . . .  | 13,120,000   |
| February, 1908 . . . . . | 11,524,000   |
| February, 1907 . . . . . | 10,482,000   |
| February, 1906 . . . . . | 8,658,000    |
| February, 1905 . . . . . | 7,726,000    |
| February, 1904 . . . . . | 6,148,000    |

**MARKET REPORTS.****Silver Prices.**

|                       | New York. | London. |
|-----------------------|-----------|---------|
|                       | Cents.    | Pence.  |
| February 22 . . . . . | 50¾       | 23 5-16 |
| " 23 . . . . .        | 50½       | 23 5-16 |
| " 24 . . . . .        | 50¾       | 23 7-16 |
| " 25 . . . . .        | 50½       | 23 5-16 |
| " 26 . . . . .        | 50½       | 23 5-16 |
| " 27 . . . . .        | 50½       | 23 5-16 |
| March 1 . . . . .     | 50¾       | 23¾     |
| " 2 . . . . .         | 50½       | 23 5-16 |
| " 3 . . . . .         | 50¼       | 23½     |
| " 4 . . . . .         | 50½       | 23 1-16 |
| " 5 . . . . .         | 50¼       | 23½     |

March 5.—Connellsville coke, f.o.b., ovens:—

Furnace coke, prompt, \$1.50 to \$1.60.

Foundry coke, prompt, \$2.00 to \$2.25.

**Metals.**

March 5.—Tin, Straits, 28.65 cents.

Copper, prime Lake, 12.90 to 13 cents.

Lake, arsenical brands, 12.70 to 12.80 cents.

Electrolytic copper, 12.65 to 12.75 cents.

Copper wire, 14.25 cents.

Lead, 4 cents.

Spelter, 4.80 cents.

Sheet zinc, 7.50 cents.

Antimony, Cookson's, 8 cents.

Aluminium, 22 to 24 cents.

Nickel, 40 to 47 cents.

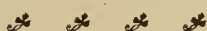
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The price of prospecting licenses is \$5.00 per hundred acres on surveyed lands and per square mile on unsurveyed lands. If the surface has already been sold, the price is only \$2.00. They are valid for three months and are renewable at the discretion of the Minister.

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On lands situate more than 20 miles from a railway in operation, \$10.00 per acre, and on lands situate less than 20 miles from such a railway, \$20.00 per acre.

Superficial products and building materials are sold \$2 and \$4 an acre according to the distance from rail road.

**MINING CONCESSIONS** are sold in entire lots in surveyed townships or in blocks of not less than 100 acres in unsurveyed territories.

Patents are obtained subject to the following conditions: The full price must be paid in cash; specimens must be produced and accompanied by an affidavit; a survey at the cost of the applicant must be made on unsurveyed

lands; work must be bona fide begun within two years and \$500.00 spent for each 100 acre concession.

**MINING LICENSES**, giving the right to work the mine and dispose of its products, are granted on payment of a fee of \$10.00 and a rent of \$1.00 per acre per annum. Such licenses are valid for one year and are renewable on payment of the fee and of the same rent. They may cover from 1 to 200 acres or one and the same person, and must be marked out on the ground by posts.

The description or designation must, however, be made to the satisfaction of the Minister.

Persons working mines must send in yearly reports of their operations to the Government.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which remarkable discoveries of minerals have already been made, and through which the new Transcontinental Railway will run.

The government has made special arrangements with **MR. MILTON L. HERSEY**, 171 St. James St. Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. Tariffs of assays can be obtained on application to him.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the province, and will supply maps, pamphlets, copies of the law, tariff of assays, etc., to all who apply for same.

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The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year, or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey made, and upon complying with other requirements, purchase the land at \$1 per acre.

The patent provides for the payment of a royalty of 2½ per cent. on the sales.

Placer mining claims generally are 100 feet square; entry fee \$5, renewable yearly.

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SEE INDEX TO ADVERTISERS PAGE XXVIII.

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*We make a specialty of*

### Manganese Steel Castings

*for Mining purposes.*

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Perfectly Sound. Never swells  
or bursts.

Reliable for all purposes for  
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Fineness 92 per cent. through  
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Strength up to standard speci-  
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Used by the leading Mining  
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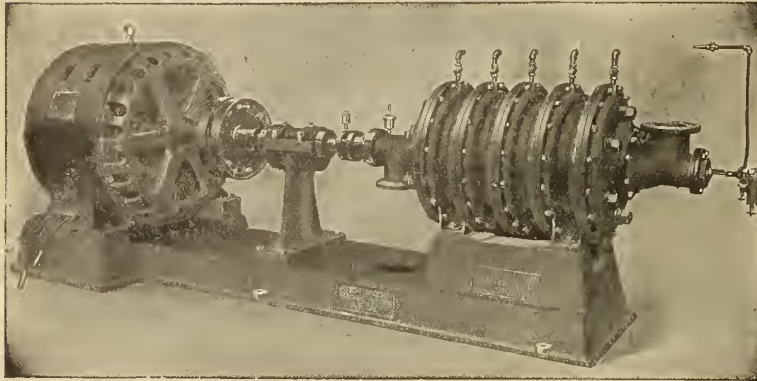
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The operation of pumps with Westinghouse Motors

will in almost all cases, excepting in very large water works, show a far greater economy than with steam-driven units. The power delivered at the pump shaft by a Westinghouse motor is at the same economical rate as that of the highly efficient engines in the power house, less the small electrical losses

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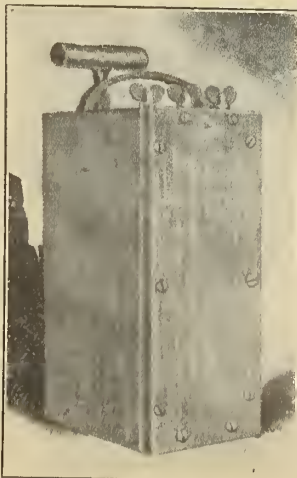
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A New High Explosive

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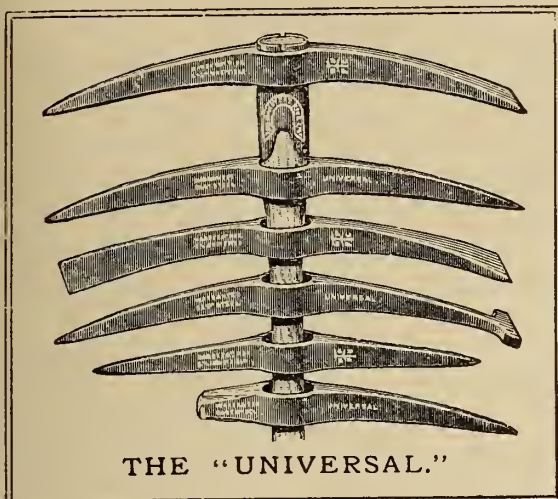
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For **HAND POWER**, for **ROCK and COAL**  
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## A One-Man Stope Drill

If you are doing any stoping or up-raising it will pay you to use a "Cleveland." To prove this we will ship you an equipment complete so that you can prove to your own satisfaction that it

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We offer you a simple, durable, "fool-proof" machine which we will guarantee will do more work than any similar machine on the market at less cost for maintenance.

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ROCK DRILLS, PNEUMATIC TOOLS, HOSE, DRILL STEEL, ETC.





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We build  
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A Sullivan Drill on a Long Column in a High Face  
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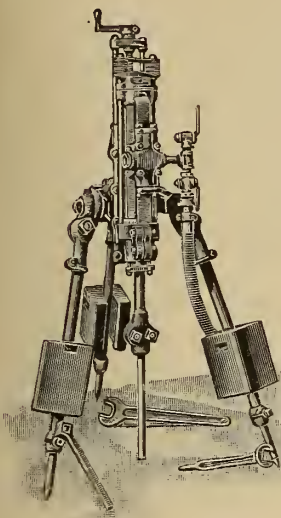
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# Mining Machinery



## ROCK DRILLS

2¾ in. x 6¼ in., 3 in. x 6 in., 3½ in. x 6 in., 3¾ in. x 7¼ in., slightly used.

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5 in x 7 in., 6½ in. x 8 in., 7 in. x 10 in., 8 in. x 12 in. Double cylinder, single drum.

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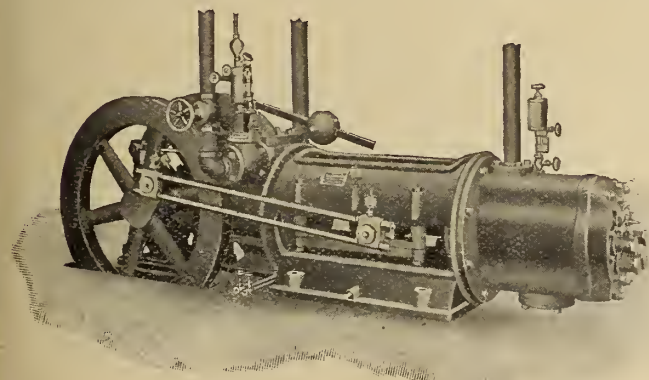
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Manufacturers, Importers, and Dealers in all kinds of Engines, Boilers, Machinery and Supplies.

# Straight-Line Steam Driven Air Compressors



This Compressor was designed to meet the demands for a portable self-contained machine of simple construction, yet capable of operating efficiently with the least amount of erection, attention, or repairs. It is extensively used for mining, prospecting, and where an undeveloped property does not warrant great initial outlay, rock excavation, and other contracting work, structural steel or timber erection, pumping and, to a limited extent, in small industrial plants where circumstances will not permit of the installation of a Duplex Compressor and belt power is not available.

The Class "C" Compressor is of the double connecting rod type. It contains many distinguishing features from other machines of the same type. Comparison with straight line compressors with box beds will show that instead of the cylinders being bolted to the bed and held in place by dowel pins, with consequent shearing strains on the frame bolts and liability to get out of line, the cylinders and frame are bolted together with vertical flanged joints, thus producing a machine of the strongest possible construction. The frame is carried up to the tops of the cylinders, giving strength at the point of greatest strain, in contrast to machines of the box bed type which are cut away at that point and require tie rods between the cylinders to keep them rigid. Owing to our self-contained design very little foundation is required.

We cannot give here a full comparison of the machine with others of the same type, but our latest catalog contains a complete description. Send for a copy.

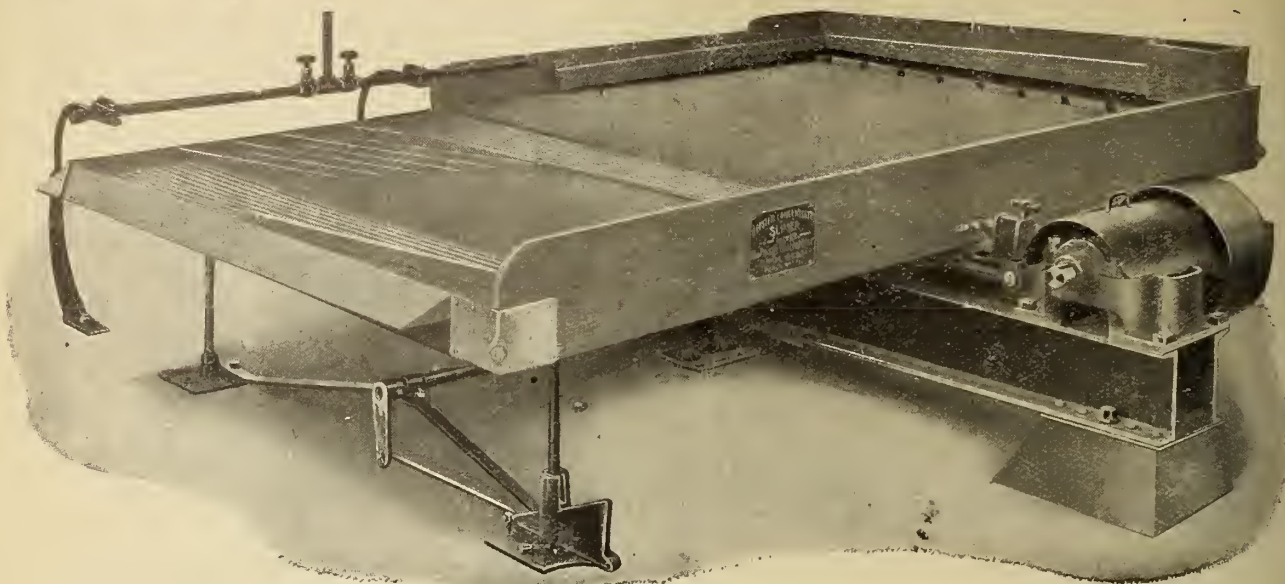
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Montreal, Canada

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The greatest advance in slime concentration attained in recent years has been accomplished by this table. Its success is emphasized by the fact that as the result of an elaborate competitive test with vanners of various makes **70 of these Tables are now in operation in the new mill of the Goldfield Consolidated Mines Co., Goldfield, Nevada**

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Chemical and Physical tests  
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Write for prices for  
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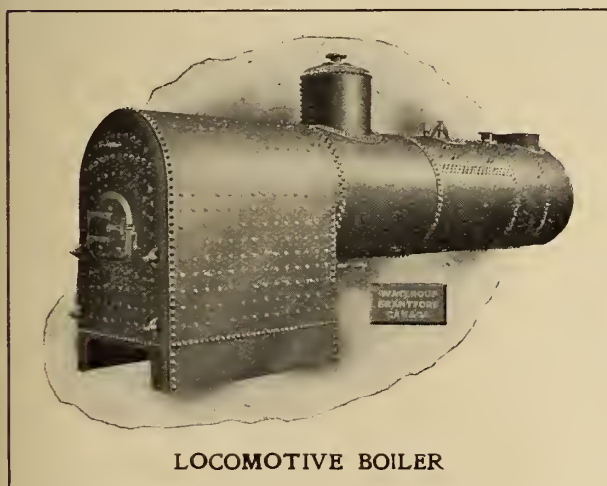
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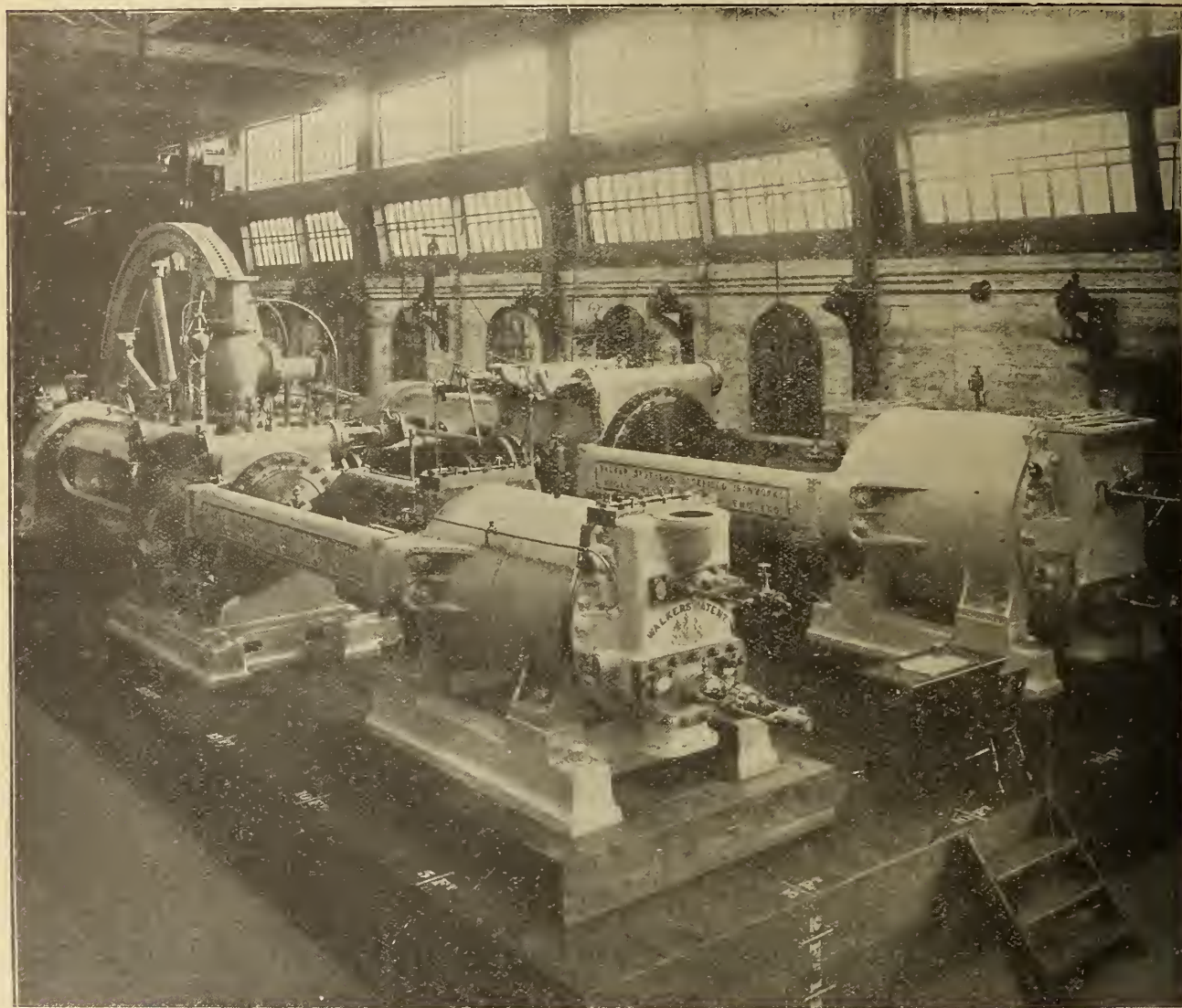
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## Wigan, England



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**CRUSHING AND GRINDING MACHINERY**  
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is used for all the wearing parts. This steel is the supreme material for  
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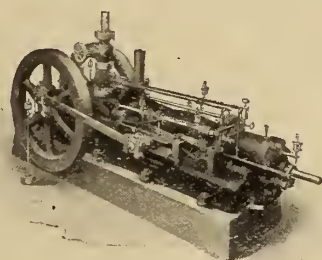
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AIR Compressors



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**Engines, Air Compressors**

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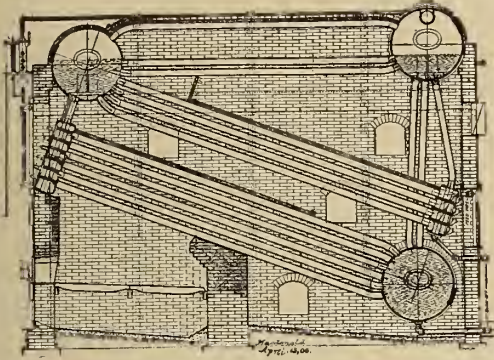
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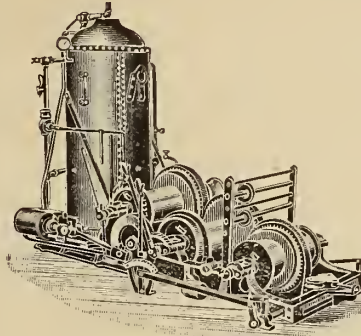
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and other Contractors' Machinery.

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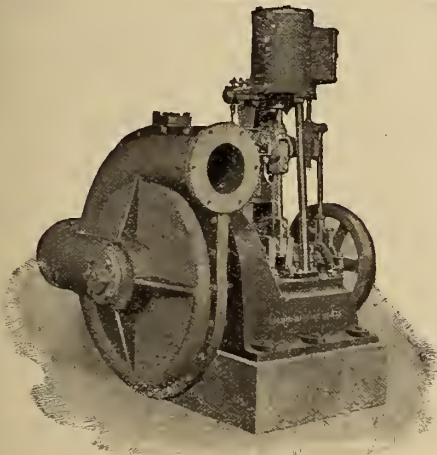
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## STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

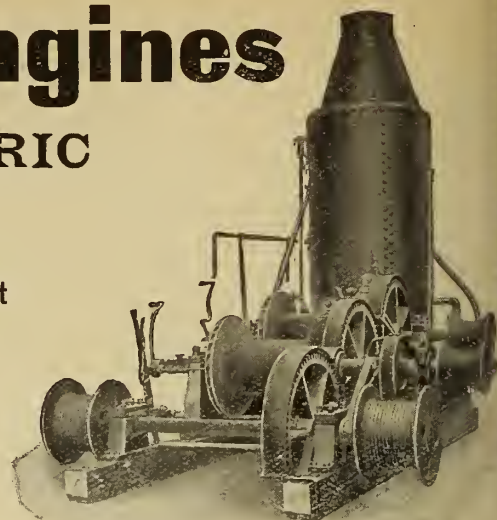
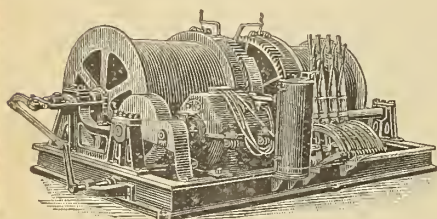
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MAY PROVE THE SOLUTION.

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All types and sizes. Complete outfits. Write for catalogue

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for its excellent equipment. All are pleased with the bright, modern coaches; the exceptionally roomy berths in the sleeping cars; superior dining car service, etc.

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All equipment is built in the Angus Shops at Montreal from the most modern designs, embodying every improvement known to practical railroading.

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## Absolutely Dustless

## The Behrend System

The Behrend Dry Concentrator is a portable and very durable machine, requiring only  $\frac{1}{2}$  horse power to operate. Capacity 8 to 15 tons per day, according to sizes of material under treatment, averaging about 12 tons.

Will recover 80 to 90 per cent. of values; is applicable to a wider range of ores and minerals than any other system; requires no skilled labor.

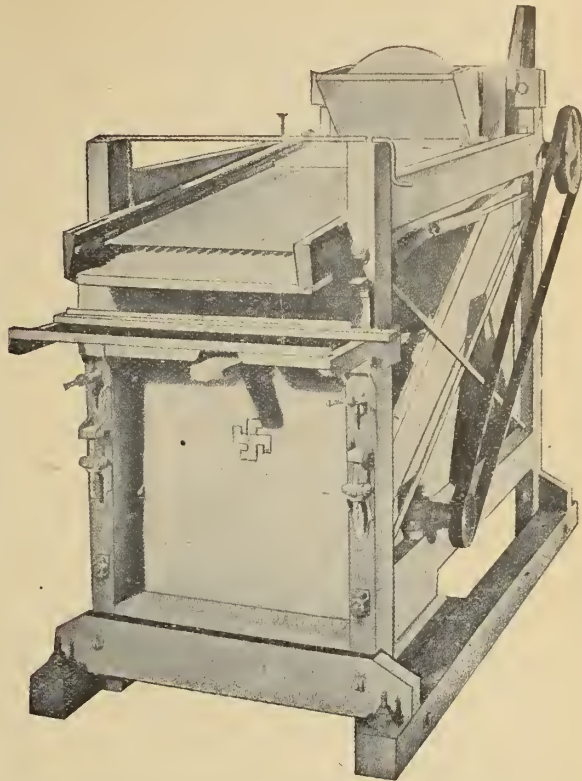
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Unrivalled as a clean-up machine in placer work, recovering the black sand, gold and platinum.

The usual dust conditions peculiar to dry concentration are entirely eliminated.

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No matter what machine you have used, or now use, the typewriter you will ultimately buy is the Underwood.

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Importers of  
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Largest carbon ever found.  $\frac{1}{4}$  actual size.

NOTE. We personally break (in this country) our carbons, thereby enabling us to determine accurately their quality. We deal only in very best quality and are always ready to ship goods on approval and for selection to responsible parties. Write us.

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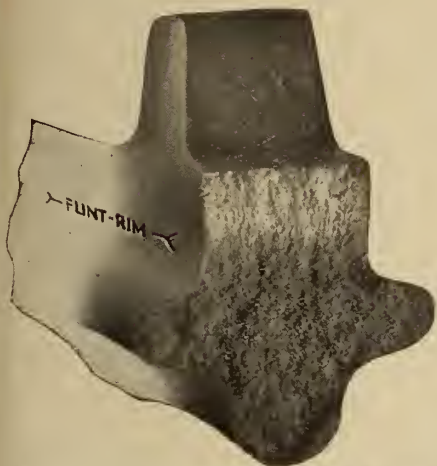
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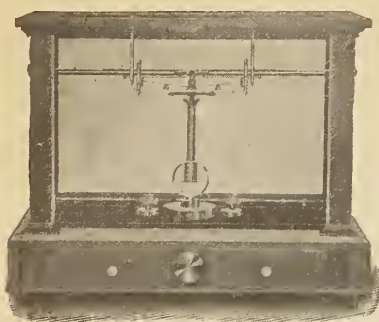
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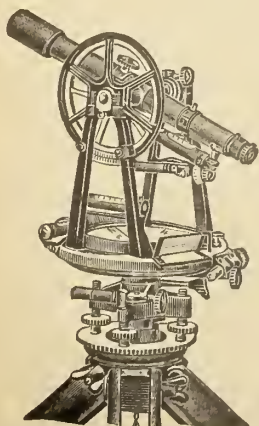


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### NOTICE OF CHANGE OF ADDRESS.

The Secretary's Office and Library of the Institute have been removed to rooms 3 & 4, Windsor Hotel, Montreal, Que. Members visiting Montreal are invited to make use of the rooms for reading or writing purposes. Office hours: 9.30 a. m., to 1.30 p. m. and 2.30 p. m. to 6.00 p. m.

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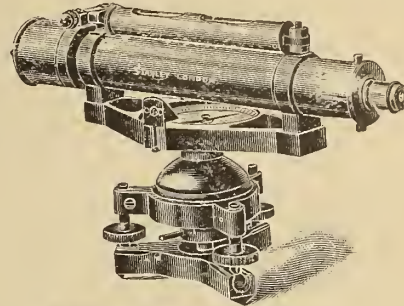
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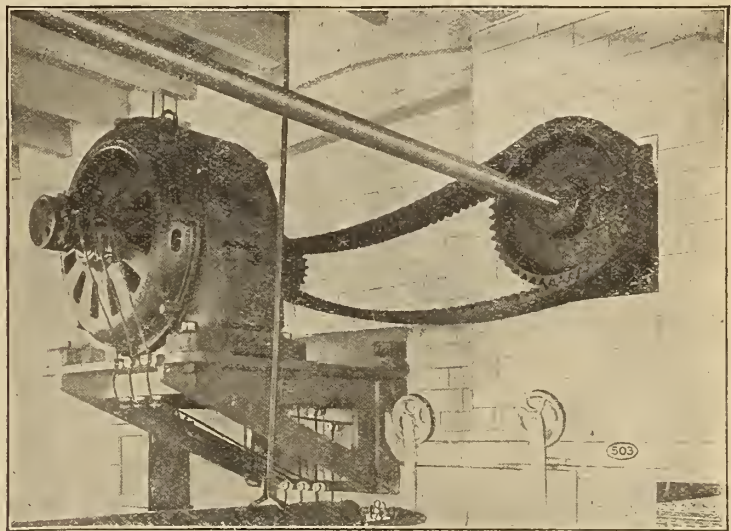
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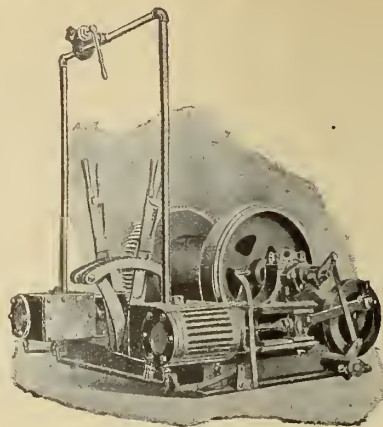
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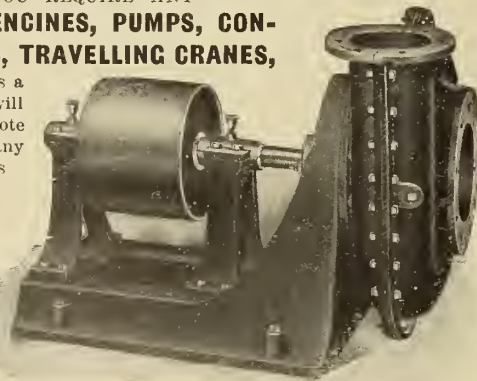
Our Mining Hoists are built in a wide range of sizes.  
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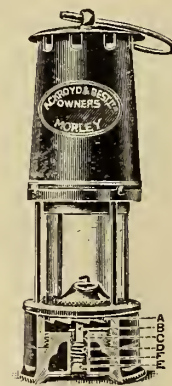
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, April 1, 1909

No. 7

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

**MINES PUBLISHING CO., LIMITED**

**Head Office** - Confederation Life Building, Toronto.

**Branch Offices** Montreal, Halifax, Victoria, and London, Eng.

**Editor:**

J. C. MURRAY, B.A., B.Sc.

**SUBSCRIPTIONS**—Payable in advance, \$2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, \$3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

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### FREE TRADE IN COAL.

The principal desideratum in discussing questions of public interest is that there be first of all a correct conception of the issue or issues under consideration. Superficial views, arguments based upon incomplete and inaccurate knowledge, are equally mischievous. And it must always be remembered that we have to deal with things as they are. Neither the weakness of opportunism nor the counsel of perfection is needed. If any situation be fully and fairly presented, it is robbed at once of half its danger.

It is not our intention here to attempt an adequate outline of the question of free trade in coal between the United States and Canada. We hope in later issues to take the subject up in as exhaustive a manner as possible. Just now, however, it is intended merely to indicate a few facts that are apt to be overlooked.

The coal industries of Nova Scotia, as has been mentioned specifically in a former editorial, provide a livelihood, directly and indirectly, for many thousands of people. They furnish almost fifty per cent. of the revenue of the province. They have been built up, under competitive conditions, to supply a Canadian demand with a Canadian article. In developing the St. Lawrence trade large discharging and storage plants have been erected at Quebec and Montreal, and the market has been held with difficulty, in spite of the tax against United States coal.

The trade with the Atlantic States is less than five hundred thousand tons. The St. Lawrence trade is considerably more than two millions of tons per annum. Both markets are competitive.

It is admitted that free trade in coal would force Nova Scotia to abandon the St. Lawrence market and confine her attention to the New England and other Atlantic coast States. Is this exchange fair? What would it mean immediately? What would it mean in the more distant future? And, most vital of questions, to whom would the benefit of the exchange actually accrue?

We shall not attempt to answer these questions finally. It will suffice to point out once more that the United States domestic market is now in a very poor condition, and that United States producers are prepared to swamp their Canadian competitors in both markets. This would mean temporarily cheaper coal to Canada. It would also mean huge permanent loss to investors in Nova Scotian collieries, distress and want to thousands of Canadian citizens, and, probably, the destruction of Nova Scotia's most important industry. Incidentally, the development of New Brunswick's coal fields would be indefinitely postponed. Millions of Canadian money would go to the United States.



Cheaper coal would be an incalculable boon to Ontario manufacturers. The removal of the present import tax is, however, no guarantee of cheaper coal. Ontario is not a competitive market.

The surrender of our Eastern markets to the United States can, therefore, be compared to certain diplomatic bargains that are matters of Canadian history.

On the other hand, the opening of the Western States to the free importation of coal and coke from Alberta and British Columbia appears to be inevitable. Our Western Provinces have the coal; the Western States have the market, and only negligible coal deposits of their own.

Canada is fast attaining nationhood. Canada will never reach a position of importance in any way commensurate with the richness of her natural resources until Canadians have learned that these resources are not exhaustless—that they must be conserved wisely and well. We have wasted our forests, we have depleted our fisheries, we have sold part of our coal lands in the West for a mess of politics.

When our powerful neighbour to the south yearns for admission to our market, we can, without discourtesy, demand time for full investigation.

Commercial independence is not without its value. A group of gentlemen at Washington need not be reminded of this.

### ELIMINATION OF POLITICS.

In governmental departments, especially in those that employ technical workers, whatever makes for appointment of new officers on their merits makes also for the good of the service. Political influence is the fly that causeth the ointment to be unsavory.

We are gratified to note that political influence is not a factor in appointments made to the staff of the Geological Survey of Canada. Whatever may have been the case in the past, at all times it must have been most repugnant to directors to have unqualified assistants foisted upon them.

The Director of the Geological Survey has issued a short, pointed, and unequivocal form of regulations governing the appointment of assistants to field parties, positions much coveted by youths ambitious and otherwise.

All assistants must have passed at least their second year examinations in the special departments of geology, mining engineering, or surveying, in a Canadian mining school or university, or some other approved higher educational institution, before taking the field. They must be men of good physique. Preference will be given to those with some knowledge of bush work.

Amongst other restrictive clauses, the most important is this: "Each applicant must sign a statement with his application that it is his intention to become

a professional geologist, mining engineer or topographer."

"These regulations," announces the circular, "must be adhered to."

This action should meet with strong approval. Canadian universities are turning out scores of mining and geological graduates. Second and third year men are every summer looking for suitable employment. Heretofore it has not been unusual to find Geological Survey parties recruited with medical students, budding theologians, embryonic lawyers, and unlabelled nondescripts. Vigour, tone, and permanence will be lent to the service by keeping its ranks free from rank outsiders.

### NOVA SCOTIA'S MINING REPORT.

A gratifying improvement over its predecessors is noticeable in the annual report of the Department of Mines of the Province of Nova Scotia for 1908. Typographically and in all other respects the 1908 report is distinctly superior to those of other years. This is no small matter. It means, first of all, that the Department is bestirring itself. Also this report will arouse far more interest than would have been possible had the old form been adhered to.

Nova Scotia has large and varied sources of mineral wealth. Providence has ordained that the winning of this wealth should not be easy, and that each of the Province's mineral industries should have its own difficulties and hindrances. The people of Nova Scotia are able to work out their own destiny. If they are to succeed in building up a mining industry that shall be commensurate with Nova Scotia's natural resources, they must grapple earnestly with fundamental problems. The men at the head of their Department of Mines are thoroughly familiar with the needs of the industry. The Department itself needs the vigorous support of an awakened public.

### MINING ACCIDENTS.

Mr. Ralph Stokes, whose letter appears on another page, has visited nearly all the more important districts of the British Empire. As a representative of a group of South African, English, and United States papers. Mr. Stokes undertook, a few years ago, to visit and describe the mines of the British Empire. His large and entertaining volume, "Mines and Minerals of the British Empire," has already assumed a place in the world of technical literature. Equally is it a useful record of travel in unfrequented ways.

Mr. Stokes refers to "the influence of more capable and scientific supervision," as indicated by "the large decrease of accidents due to explosives, which class of mishap is above all attributable to carelessness or inefficiency."



**THE McCHARLES PRIZE.**

The late Aeneas McCharles, a native of Cape Breton and for many years a citizen of Sudbury, Ont., was deeply impressed with the importance of improving our modern means of extracting metals from their ores, or of treating minerals generally. To stimulate Canadians to attack the problems of metallurgy and ore-dressing, Mr. McCharles set apart in his will a fund of sufficient bulk to provide a prize of \$1,000 to the Canadian who does most in any one year to advance the sciences mentioned above.

The drafting of regulations was left in the hands of the Board of Governors of the University of Toronto. These are printed on another page, and should be read carefully.

The McCharles prize should set every young eligible Canadian thinking.

**A RESOLUTION.**

The following resolution has been forwarded to Ottawa by Secretary Hayward:—

"The Mining Society of Nova Scotia beg to congratulate the Government of Canada on the resumption of the important portfolio of Minister of Mines by the Honourable William Templeman, and have confidence in assuming that the vigorous and wise policy which has brought such signal and beneficial service to the Western Provinces will be extended to Nova Scotia."

In connection with the above we are informed that the Minister of Mines intends to visit Nova Scotia officially during the current year.

Mr. R. B. Watson, manager of the La Rose and Nipissing, paid a visit to Gowganda recently to look over some of the prospects.

## PROBABLE EFFECT OF THE ACREAGE TAX ON MINING LANDS IN ONTARIO.

Paper read by G. R. Mickle before the Canadian Mining Institute, Montreal Meeting, March, 1909.

In order to estimate the effect the acreage tax levied by the Supplementary Revenue Act, 1907, will have, it is necessary to understand not only this Act, but also the conditions under which mining lands have been patented or leased from time to time in Ontario. This Act imposes a tax of two cents per acre on all lands patented or leased for mining purposes, situated in territory having no municipal organization. The tax is a statutory one, no notice or tax bill is, therefore, required. A penalty of 10 per cent. attaches if the tax is not paid by the date specified (October 1st, each year), and after a certain time the lands in default with regard to taxes are forfeited after notice is published in the Ontario Gazette. The Act requires that a tax roll should be prepared showing all the lands taxable. This will be referred to frequently in the course of this paper.

A synopsis of the various Acts and regulations is given in Volume II, Report of Bureau of Mines. Previous to 1867, when Ontario was formed into a separate province, mining lands were disposed of under Orders-in-Council. It was intended originally to grant five square miles, or 3,200 acres, but this was never carried out, and the first grant of land as mining land was in a location of ten square miles, or 6,400 acres, the block being 5 x 2 miles, five miles being laid out along the supposed course of the vein. In those days they must have had great veins. The first "location" granted in this way was the Cuthbertson (Bruce Mines), containing 6,458½ acres, and the patent is dated at Quebec on the 5th October, 1852. In the case of islands or areas broken by any natural obstacle, the location might exceed or be less than 6,400 acres, and accordingly there appear on the tax roll to-day 22 locations containing in all 132,685 acres, the largest being 9,793 acres and the smallest 1,130. The land was sold at 80 cents per acre, and payments spread over a number of years. Priority of discovery was a first requirement.

In 1853 the regulations were changed so that by securing a license to explore good for two years and

costing \$100.00 the licensee might secure an area not exceeding 400 acres, which must afterwards be purchased at \$1.50 per acre. Subsequently the license fee was abolished and the land went to the first applicant under working conditions. These conditions were afterwards eliminated. In 1864 the Gold Mining Act was passed (27 Vict., Chap. IX.) by the Legislature of the United Provinces. This Act was occasioned by the gold excitement on the Chaudiere and other rivers in Quebec, and provided for the setting aside of mining divisions wherein licensees might stake out claims of small area (less than one acre). Under the regulations existing from 1853 to 1869 about 35,000 acres of land were granted in parcels of 400 acres or thereabouts, which now appear on the tax roll. The area of these locations in organized territory has not been ascertained.

In 1869 the first really important Mining Act was passed in Ontario (32 Vict., Chap. 34). The area of mining locations was fixed at 320,160 or 80 acres. Regulations were also contained in this Act for the declaration of Mining Divisions as in the Act of 1864, the area being 200 feet square or about one acre. Neither discovery or work was required to hold mining lands acquired by purchase, the Act simply stating "Crown Lands supposed to contain mines or minerals may be sold as mining lands," or they might be worked as mining claims if in a declared mining division.

In 1891 the Public Lands Act (54 Vict., Chap. 7) was amended, so that the mineral rights were declared reserved in grants of land for agricultural purposes, even if the reservation was not expressly mentioned.

The Mines' Act, 1892 (55 Vict., Chap. 9) is the next important one, no substantial change was made in the size of the locations except that they might be 320, 160, 80 or 40 acres. The system of leasing whereby a part of the rental money might be applied on purchase was made a feature of this Act. Working conditions were included (\$4.00 per acre during 7 years). The provisions regarding mining claims staked by licensees in



mining divisions were retained, the area being from 5 to 20 acres, according as one or more persons were involved.

By the Act of 1897 (60 Vict., Chap. VIII.), discovery was introduced and the amount of land one person might apply for in one year was restricted. Working conditions were maintained.

By the Mines' Act of 1906 (6 Edward VII., Chap. XI.), the whole province where any Crown lands were left was divided into mining divisions. (See Section 79.) The mining location, therefore, automatically disappeared and the mining claim is limited to a maximum of 40 acres. The time in which the purchase price may be paid is three years after application. By the Act of 1897 in the case of mining locations it was three months. (Sec. 37.)

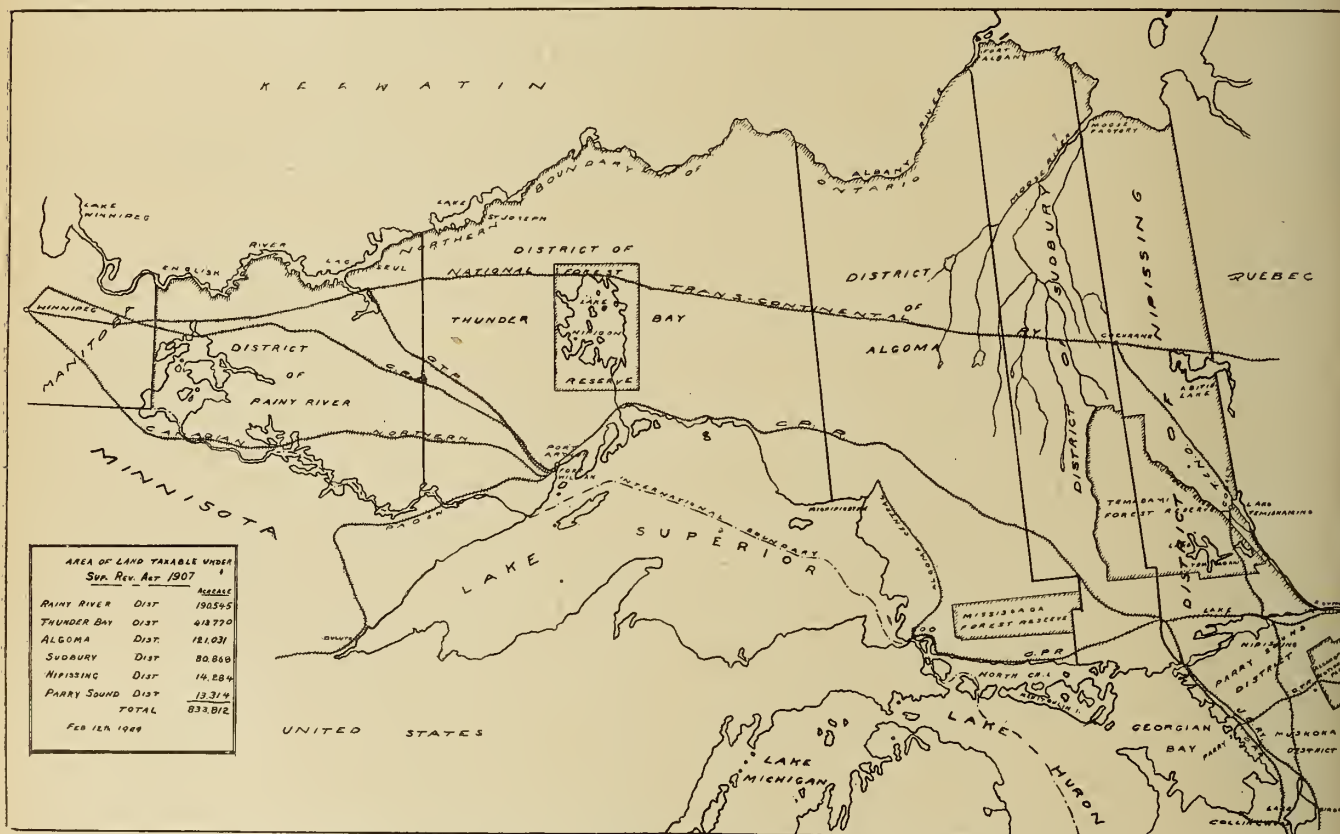
It was stated above that only lands in territory with

land is not suited for agriculture and mining is not actively pursued, no stable population can exist and no municipalities can be formed, and the land, therefore, remains on the tax roll. In general, therefore, a large taxable acreage indicates a backward state of mining.

Coming now to the map, in which the Judicial districts have been adopted in dividing up the province, as these are more likely to remain unchanged for a time than the mining divisions, the acreage of taxable land is given in each.

In Rainy River District the maximum size of any location is 320 acres except in case of broken fronts. Nearly all this land was taken up during the gold excitement of 1896 to 1900. There are also a great many acres bought for iron lands.

Thunder Bay contains about half the total taxable area of the Province, and includes most of the large



Map of Northern Ontario, showing area of lands taxable under Supplementary Revenue Act, 1907.

no municipal organization was taxable. In order to form a municipality it is necessary to have a certain minimum of population; thus the "Act respecting the Establishment of Municipal Institutions in Territorial Districts" (Chap. 225, R.S.O. 1897, Vol. 2) provides that a surveyed township or unsurveyed territory not exceeding 20,000 acres in area and with a population of not less than 100 persons may be formed into a municipality on petition of not less than 30 persons to a district Judge, who is required to call a meeting. At this meeting not less than 30 freeholders or householders must be in favor of forming the municipality. It requires therefore a population of a stable character such as can only exist where there is steady occupation. Lumbering operations, for instance, except those in connection with manufacturing lumber, are not likely to produce the necessary conditions and there remain then practically only agriculture and mining. If the

locations of 6,400 acres mentioned before. The balance of these are in Algoma. As stated before, there are 22 of these immense locations on the tax roll, containing in all 132,685 acres. Seven more than this were patented with 42,418 acres which are now within organized municipalities, making 175,103 acres granted in this lavish way. These seven large locations (6,400 acres) happened to be situated where there was agricultural land and it is due to this that there was sufficient population to form municipalities.

The same conditions hold true in Algoma to a lesser extent. In this district there is also a large area of Indian lands which have been patented by the Dominion Government. As the form of patent does not convey the mineral rights expressly, and gold and silver are reserved in the Dominion Lands Act, it has been held that Indian lands are not taxable under the Supplementary Revenue Act.



In the Sudbury district more municipalities have been formed, many of the townships having sufficient stable population to organize municipalities, solely or mainly on account of the mining industry.

Nipissing, which includes the Temiskaming and Montreal River mining divisions, where there has been such a great mining activity for the last three or four years, shows a very small taxable area comparatively. This is due to several reasons. In the first place most of the mining land has been staked under the Act of 1906, according to which, after staking, a mining claim may be held for three years without patenting provided the working conditions are fulfilled, consequently these claims do not appear on the tax roll. Then a great deal of the land that was applied for previous to 1906 was under the regulations governing mining divisions in the Act of 1907. A claim, therefore, could not exceed 40 acres. Moreover, the successful mining operations have attracted a population sufficient to form municipalities and consequently many of the claims patented would not be found on the provincial tax roll. More municipalities will doubtless be organized, and even when a proportion of the great number of claims now existing are patented, there will probably be no very great area subject to provincial taxation for any length of time.

The Larder Lake section, although something like 4,000 claims were staked there, shows very few patented ones, although it is over two years since the heavy claim-staking took place there.

In Parry Sound, to which Muskoka is added, a great many acres have been bought as mining lands by lumbermen previous to 1897. This was only done to secure sufficient land to pasture their stock. If applied for as agricultural land settlement duties would have been required and only a limited area of 200 acres would be granted.

The effect of this acreage tax cannot be fully determined till the time for forfeiture arrives. According to the Act the earliest date at which that can take place is the 30th June, 1910. At the present time a little over half the total area is in good standing with regard to taxes. Judging from the correspondence received and the way payments come in most of the owners intend to retain their mining lands. As a maximum I would consider 200,000 acres might be forfeited and a minimum of 100,000. In some cases the land belongs to insolvent estates, it is, therefore, not in the interest of anyone in particular to keep up the taxes. In many instances also, the owners acquired the land in time of an excitement and have lost all interest in it now.

## Translation of Article by O. Stutzer, of Freiburg, in the "Zeitschrift Fur Praktische Geologie," December, 1908.

In the beginning of May of this year I visited the great cobalt-silver deposits of Temiskaming in Canada. These deposits are fully described by Dr. Miller in his well-known report, "The Cobalt-Nickel Arsenides and Silver Deposits of Temiskaming," 1908.

In Cobalt they regard the diabase which occurs there as the source of the ore, and this belief is founded on the close relations which exist between the diabases and the ore veins in that district. Moreover, the occurrence in Sudbury strengthens this belief, as the nickel ore there occurs in norite, which is a rock closely allied to the diabases. The only other eruptive rock known in Cobalt is the granite. This granite was even in pre-Huronian time partly solidified, but remained active for considerable length of time in greater depths, as can be seen from the younger granite dyke in the southwest corner of the University mine at Giroux Lake. Here the diabase is cut through by the granite. In this granite area I suspect the source of the cobalt-silver ores. The analogy with other occurrences of this type of ore, where the granite is the source of the cobalt-silver ores, leads one to this, and especially may be mentioned the similar occurrence in the Harz Mountains, Joachimsthal, and Annaberg and Schneeberg. The source of the ore there is the granite of Eibenstock, which is rich in alkalis. Also Chalanches, in France, and Wittichen, in Schwarzval. The granite is probably connected genetically with the cobalt-silver ores.

Of further interest is the question of the influence of the country rock on the ore bodies. It is known in Cobalt that the veins in diabase and in the deeper lying Huronian conglomerate carry silver, but in the still deeper lying Keewatin there is generally only cobalt and nickel. Miller explains this, page 33 of his report, third edition, somewhat in the following manner:—

After the deposition of the cobalt-nickel arsenides the cracks were split open again, and so prepared a

way for the percolation of the silver-bearing solutions and deposition of silver.

The rocks of the Keewatin are tougher than those of the Huronian, and therefore this second cracking was confined to the latter rock, that is, Huronian. In consequence of this we find the silver ores only in the higher-lying series of rock. The source of the silver-bearing solutions is not regarded in this supposition as a leaching product of rocks which lie higher, but as a primary deposit of post-volcanic springs in connection with the eruption of the diabase.

According to my view, the origin of the cobalt-nickel-silver ores is not divided in point of time, although most silver and calcite belong to the youngest minerals in the vein. One can collect hand-samples in which the silver is intimately inter-grown with smaltite, which only permits a simultaneous formation of both minerals. As an example of this may be mentioned some pieces of ore in the Trethewey vein. In these pieces it is seen especially well in thin sections, the aborescent silver forms being embedded in the massive smaltite. The shape of the solid silver resembles dendritic forms. It cannot be regarded, however, as a thin deposition of silver in a crack.

If we suppose that there is a relatively simultaneous origin of the different ores, then where we have cobalt-nickel ores we should have silver, too, but that is not the case. In the diabase and in Huronian we find silver, but generally not in the Keewatin, and I was even told that on passing from the Huronian conglomerate to the Huronian slates the silver values are lost, but appear again on coming back into the Huronian conglomerate. The country rock must, therefore, in Cobalt, have had an influence on the precipitation of the ore out of the solutions. This brings to mind the fahlbands of Kongsberg, in Norway. Those fahlbands are zones of rock impregnated with pyrites, which are cut through by



ore veins. The veins are rich in silver only at the junctions with the fahlbands. This phenomenon is best explained as the consequence of electrolytic process. The electrical currents in the earth circulated most intensely through the zones of rock which are impregnated with pyrites and precipitated electrolytically the ores out of the solutions.

In Cobalt the diabases and the different conglomerates perhaps acted as precipitants. The diabase carries a good deal of magnetite, and the Huronian conglomerate has in places a considerable amount of pyrites. This supposition is, however, not entirely satisfactory, as there is a good deal of diabase material in the Keewatin. The Keewatin is certainly decomposed and greatly folded or sheared. At any rate, it would be an interesting task to test the electrical conductivity of the different rocks of Cobalt on the spot.

#### Comments on Mr. Stutzer's Article.

It is easily seen that Mr. Stutzer understands the points to which attention should be paid in a camp like Cobalt. His visit was, however, brief, and the regional geology new to him, hence it is not surprising that some of his conclusions should not be correct. For instance, he says that "This granite (Laurentian) was, even in pre-Huronian time, partly solidified," etc. The granite was not only solidified, but it and the Keewatin series were subjected to profound erosion. The granite dike of the University property, to which Mr. Stutzer refers, belongs to a much later period of eruption. It is considered to represent the acidic residue of the post-Middle Huronian diabase. Similar dikes are quite numerous in the Montreal River area. A vast period

of time elapsed between the intrusion of the Laurentian granite and that of the granite dike of the University.

Mr. Stutzer infers that "granite is the source of the cobalt-silver ores." Of course this has been the accepted theory in Europe, but anyone who has carefully studied the association of diabase with these ores in Ontario is forced to conclude that the metals were contained in the original diabase magma. When the Cobalt district was first studied it was only to be expected that these somewhat unique ore deposits would be compared with those to which Mr. Stutzer refers in Europe. It was well known what explanation had been given as to the source of the metals, but experience of deposits over a wide area in Ontario shows that the European theories of origin are not applicable, at least, to the Ontario deposits.

Mr. Stutzer refers to the possible influence which country rock may have had on the ore bodies. This point was carefully studied at Cobalt, but it was decided that the country rock had no special significance. Much of the Huronian slate and conglomerate is similar in composition to the Keewatin, from which a large percentage of the material in the Huronian has been derived by erosive agencies. Hence if the Huronian is proved to be a good precipitant for such solutions the Keewatin should have a similar effect. There is no doubt that there have been two periods of disturbance, but the cobalt and nickel were not all deposited in the veins during the first period. The solutions gradually changed; some of the silver components, such as the silver sulph-antimonide and arsenic which occur in small quantities, may belong to the earlier period of decomposition. Much the greater part of the silver was deposited after the second period of disturbance.

## EARL GREY'S ADDRESS AT THE C.M.I. ANNUAL DINNER.

His Excellency said he was glad to be able to attend the annual dinner of the Canadian Mining Institute. It was a comparatively young organization, but growing rapidly. In 1898 it had only 63 members; now it had nearly 900.

The mining industry of Canada had only just begun. Until recently, agriculture was the sole industry. The first prospectors and miners were necessarily agriculturists, with no knowledge of mining; consequently mining propositions which under good management and transportation facilities would have been successful, turned out failures, owing to the want of transportation, skilled workers, and intelligent direction. These deficiencies, which interfered with successful mining a few years ago, were now to a great extent removed.

That great Canadian, Professor Grant, whose influence has left so deep an impression on the life of Canada, recognized the want of a school of mining. He opened a school at Kingston in 1893, which has exerted a marked influence on technical education in this country. The mining departments of McGill and Toronto have also done much to supply trained men to intelligently develop the country's mineral resources.

The mineral production of \$10,000,000 twenty years ago had nearly trebled to \$28,000,000 in the next ten years, and that amount had again more than trebled in the last decade to \$86,000,000 for 1907.

The mining industry, like all others, has been checked in its rate of growth in the year 1908 owing to financial stringency and lower prices of silver, lead and copper, but the output of 1908 had exceeded that of 1907, and nothing could be more certain than that the increase in the total value of minerals produced in Canada during the next twenty years would be as great as that which had taken place in the last twenty years.

He understood the object of the Institute was to place the mining industry of Canada upon an efficient and honest basis; to meet both professional and educational requirements; to educate the prospector as well as the mining engineer; to turn out technical men; to provide them with opportunities for exchanging their views and studying each other's methods; and to make the full membership of the Institute a guarantee of both knowledge and, what was far more important, character.

He was informed that the members of the British and foreign mining associations who visited Canada in 1908 had been greatly impressed with the extent of unprospected area in the Dominion, with the magnitude of operations, and with mechanical appliances in operation at Grand Forks and other places. The visit had been mutually advantageous. The visiting experts made some practical suggestions, and also acquired some good ideas.

One result of the visit of the British Mining Associ-



ation, of great benefit to Canada, would be that trustworthy information about Canadian mining propositions would now be obtainable in London, with the result that the mineral industry of Canada would be better safeguarded than hitherto against artificial booms, followed by unjustifiable slumps.

His Excellency, while confessing that his personal sympathies were more with agriculture than with mining, willingly admitted that there was no industry which contributed more to the general prosperity of a country than mining. Successful mining involved increased demand for the employment of capital and labor, increased industrial developments, increased commercial activity, increased land settlement, increased railway traffic and increased national prosperity.

Although the mineral output of Canada was at present only \$12.71 per head of the population, and the agricultural output \$63.90 per head, it was quite possible that these proportions might some day be reversed.

They had, close behind them, the largest bit of unprospected country left in the world. Of the "pre-Cambrian" formation, measuring 2,000,000 square miles and covering half of Canada, they only as yet knew a little about the southern fringe. Although the existence of silver was known at Temiskaming 150 years ago, the discovery of Cobalt was only made in 1903. This discovery was an accidental result of railroad construction, as were also the nickel mines of Sudbury and the asbestos mines of Quebec, notwithstanding that the existence of asbestos had been known for some time.

Although they had only combed a little bit of the southern fringe of this great ore field, they had combed out of this southern fringe the Cobalt silver mines, the nickel mines at Sudbury, the Lake Superior iron mines—the greatest iron mines in the world, and the Michigan copper mines, which occur in the same formation which has flowed over from the Laurentians into the United States.

The rich results that had followed the partial prospecting of the southern fringe of the pre-Cambrian formation justified the expectation that in the unopened cupboard of their treasure house was greater wealth than that which had been already revealed to them, and it was quite possible that the mineral wealth of the Appalachian and Cordilleran ranges was greater still. No one could form an estimate of the riches in the unopened treasure houses of Canada. It was, however, certain that the development of the untouched mines meant great material prosperity for Canada.

The development of a silver camp meant more consumption of timber, coal, coke and limestone; more freights, more machinery, more chemicals, more miners' supplies—all involving an increase of business and of railway traffic, and a consequent advance in land values. The systematic and organized development of the mining industry of Canada was therefore a matter of national importance.

It was well known that the per capita production of men engaged in mining was greater than that of men engaged in agriculture. In Canada the per capita production of men engaged in mining was estimated as twice and a half that of men engaged in agriculture. The Government of New South Wales had published reports from their Government Statistician, Mr. Coghlan (now their Agent-General in London) that the men engaged in silver-lead mining produced more wealth and gave more employment to affiliated industries than

ten to twelve times the same number of men employed in agriculture.

His Excellency had already pointed out the importance of the mining industry to the railways. He added that it had been a surprise to him to discover that in Canada, which had been regarded as a country mainly agricultural, the business of the mines afforded 33 per cent. of the total railway traffics during the year 1907, while the products of agriculture afforded only 17 per cent., and in the United States the difference in favor of mines was still greater, the mines affording 54 per cent. of the total business done by the railways, and agriculture only 9 per cent.

The importance of developing the mining industry would thus be obvious to everyone. At present the cars which took the wheat from the Northwest to the seaports were hauled back empty across half a continent. The development of the mining industry would enable the railway companies to haul back full cars instead of empties.

Ships to Africa went full of the merchandise and machinery required for the mining industry and returned comparatively empty, because gold and diamonds made no freight to speak of. With the development of the mining industry of Canada the great railway companies of Canada might look forward to full trains both ways, and would consequently be in a position to offer lower rates to the farmers; and in addition to the new markets and cheaper transportation rates that mineral developments would bring to the Canadian farmer, the effect of the development of the mining industry would be to strengthen the population of the East, and would provide a balancing compensation to the increasing weight of the growing West, and thus help to ensure the stability of the national equilibrium.

#### MONEY FOR GEOLOGICAL SURVEY WORK.

The work of the United States Geological Survey is carried on by means of appropriations made each year by Congress, chiefly in the act providing for "sundry civil expenses of the Government," popularly known as the sundry civil act. The sundry civil act passed by the Congress which has just adjourned appropriated for the Survey for the fiscal year 1909-10 the sum of \$1,407,390, specifying that it be applied to the following purposes:—

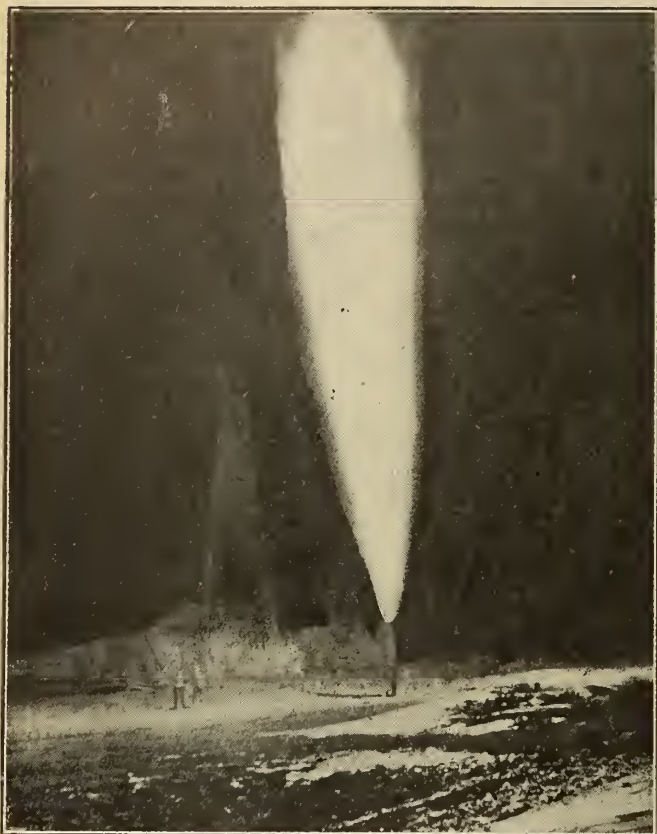
|                                            |           |
|--------------------------------------------|-----------|
| Geological surveys .....                   | \$225,000 |
| Chemical and physical researches .....     | 20,000    |
| Mineral Resources report .....             | 75,000    |
| Topographic survey .....                   | 350,000   |
| Forest-reserve topographic surveys .....   | 75,000    |
| Water-resources investigations .....       | 100,000   |
| Structural-materials investigations .....  | 100,000   |
| Fuel-testing investigations .....          | 100,000   |
| Mine-accidents investigations .....        | 150,000   |
| Geologic maps (printing and engraving).... | 100,000   |
| Preparing illustrations for reports .....  | 18,280    |
| Books for library .....                    | 2,000     |
| Statutory and temporary salaries .....     | 88,760    |
| Mine inspectors' expenses .....            | 3,350     |

\$1,407,390

An appropriation of \$90,000 for the investigation of Alaskan mineral resources by the Geological Survey was carried in the urgent deficiency act. Other appropriations for rent of offices in Washington and for publications make the total amount provided for the work of the Survey about \$1,700,000.



## NATURAL GAS IN ALBERTA.



GAS WELL AT BOW ISLAND, ALBERTA.

7,000,000 cubic feet of gas when shot—4,000,000 when photo taken.

Railway corporations are becoming increasingly active in the development of Canada's natural resources. The Canadian Pacific Railway, which was, of course, the pioneer line through our North-West, is also engaging in large enterprises that have a most important bearing upon the future of the country. Its interests in metallurgical and coal-mining ventures are well-known. It has inaugurated comprehensive irrigation schemes. But the most striking of its recent activities have been in connection with the exploitation of the gas fields of Alberta. Of this work, directed successfully by a past president of the Canadian Mining Institute, we hope to have more to say in the near future. The present intention is to give merely an announcement of results already attained.

Under the supervision of Mr. Eugene Coste, a very important well has just been completed to the depth of over 1,900 feet. This well has proved to be a gusher of 7,000,000 cu. feet of natural gas per diem. It is situated near the banks of the South Saskatchewan River, Twp. 11—R. 11—west of the 4' meridian. The accompanying photos show the well burning at night before it was tubed and closed in. Although at the time the photo was taken the well was under full control by means of valves controlling the flow on a pipe line, it could not be closed in until high pressure test tubing valves and fittings had arrived.

Photo No. 2, taken by Mr. S. Mavor, of Glasgow, during the C. M. I. excursion last September, shows one of the wells drilled by Mr. Coste for the C. P. R. This well is at Dunmore Junction, and gets its gas from a depth of nearly 1,100 feet. We are informed that the

flow is one and one-half million cubic feet per day. The distance between the first (Bow Island) well mentioned and the Dunmore Junction well, is nearly 40 miles in an air line. This fact, especially when it is understood that the gas wells of Medicine Hat, Stairs, and Suffield are located between them, shows that already a wide gas belt has been demonstrated by the C. P. R. What effect this supply of cheap fuel and power will have upon the growth of the surrounding districts is not hard to guess. In nearly all discovered fields gas and oil succeed one another. The eventual discovery or appearance of oil would add enormously to the wealth of the country.

It is satisfactory to note that a Canadian corporation, employing a Canadian engineer, has successfully exploited this promising field. Mr. Coste is to be congratulated on the practical value of his geological diagnosis of the district.

Aplite is defined by Geikie as being a fine-grained mixture of quartz and feldspar, both of which minerals have not infrequently intergrown (micropegmatite). Aplite is found especially in veins of granite.

Out of about 150 discoveries of gold and silver in the United States and Canada, tabulated by W. R. Crane, only ten are designated "accidental." The rest, with one or two exceptions, are attributed to the intelligent efforts of the prospector. It may be significant that most of the accidental discoveries date back more than fifty years ago. The most recent is twenty-two years old.



GAS WELL AT DUNMORE JUNCTION, ALBERTA.

1,500,000 cubic feet of gas per 24 hours—September, 1908.





BOW ISLAND GAS WELL—FLAME 160 FEET IN HEIGHT.

### THE McCHARLES PRIZE.

In view of the great interest now being taken by Canadians in all developments in the natural resources of the Dominion, the bequest of the late Æneas McCharles providing a fund for the purpose of recognizing the inventions or discoveries of special merit made by Canadians will be welcomed by all.

The following extract from the will of Mr. McCharles and the accompanying regulations drawn up by the Board of Governors of the University of Toronto governing the award as set forth below, give full details concerning the prize, which will be offered for the first time this year:—

“In connection with the bequest of the late Æneas McCharles of Provincial Government bonds of the value of \$10,000, on the following terms and conditions, namely, that the interest therefrom shall be given from time to time, but not necessarily every year, like the Nobel prizes in a small way: (1) To any Canadian from one end of the country to the other, and whether student or not, who invents or discovers any new and improved process for the treatment of Canadian ores or minerals of any kind, after such process has been proved to be of special merit on a practical scale; (2) Or for any important discovery, invention or device by any Canadian that will lessen the dangers and loss of life in connection with the use of electricity in supplying power and light; (3) Or for any marked public distinction achieved by any Canadian in scientific research in any useful practical line. The following

conditions, as passed by the Board of Governors, determine the method of award:—

(1) The title shall be the McCharles Prize.

(2) The value of the prize shall be One Thousand Dollars (\$1,000.00) in money.

(3) The term “Canadian” for the purposes of this award shall mean any person Canadian born who has not renounced British allegiance; and for the purposes of the award in the first of the three cases provided for by the bequest, domicile in Canada shall be an essential condition.

(4) Every candidate for the prize shall be proposed as such in writing by some duly qualified person. A direct application for a prize shall not be considered.

(5) No prize shall be awarded to any discovery or invention unless the same shall have been proved to the satisfaction of the awarding body, to possess the special practical merit indicated by the terms of the bequest.

(6) The order of priority in which the three cases stand in the wording of the bequests shall be observed in making the award; that is, the award shall go *caetris paribus* to the inventor of methods of smelting Canadian ores; and, failing such inventions, to the inventor of methods for lessening the dangers attendant upon the use of electricity; and only in the third event, if no inventors of sufficient merit in the fields of metallurgy and electricity present themselves, to the inventor distinguished in the general field of useful scientific research.

(7) The first award shall not be made before June, 1909.”

A committee to make the award of the prize has been appointed by the Board of Governors of the University of Toronto.

It will be seen from these conditions that the Committee of Award is given a wide scope in making its selection, as the prize is open to candidates in every part of the Dominion, and is not necessarily confined to those who have made discoveries or inventions in recent years.

All communications in connection with this award should be addressed to the Secretary of the McCharles Prize Committee of Award, University of Toronto, Toronto.

### TRAFFIC TO GOWGANDA.

The following statement may be of interest as showing the amount of money that is being spent at the present time in preparation for development of the silver prospects in the Gowganda and Montreal River districts.

As everyone who is interested in that country knows, freight is taken by rail either to Charlton on the T. & N. O. Ry. or to Selwood on the C. N. O. Ry., and is then transferred to teams to be hauled to its destination.

As far as I could learn five hundred tons or more is being handled daily from Charlton to Elk City at an average rate of at least 75 cents a hundred pounds, giving a daily expenditure for freight, over and above the railway charges, of \$7,500 a day.

About one hundred tons of this freight stops at Elk City, while the remaining four hundred tons goes on to Gowganda. The average freight rate from Elk Lake to Gowganda is at least \$2.50 a hundred pounds or \$20,000 a day for the four hundred tons. This gives a total daily freight charge from Charlton to Elk City and Gowganda of \$27,500 a day, or \$825,000 a month.

It is not improbable that the value of the material laid down at Charlton is worth more than the freight charges amount to to its destination, or, in other words, that the supplies and machinery being sent into the Gowganda and Montreal River districts at present represents an expenditure in first cost and freight of something like two millions of dollars a month.

This enormous expenditure shows a very real intention on the part of those interested in mining in Ontario to prospect and develop that northern country.

J. B. TYRRELL.

9 Toronto St., Toronto.

## REPORT OF THE DEPARTMENT OF MINES, PROVINCE OF NOVA SCOTIA, 1908.

As was noted editorially in the Canadian Mining Journal, the Report for 1908 is a great improvement on its predecessors. It is clearly printed, well arranged, and amply illustrated.

The following summary shows the mineral production:—

|                                | Year ended<br>Sept. 30,<br>1907. | Year ended<br>Sept. 30,<br>1908. |
|--------------------------------|----------------------------------|----------------------------------|
| Coal raised (gross tons).....  | 5,730,660                        | 6,299,282                        |
| Pig iron (gross tons).....     | 293,436                          | 326,303                          |
| Iron ore (net tons) .....      | *630,275                         | *902,475                         |
| Limestone (net tons) .....     | 458,601                          | 484,685                          |
| Coke made (net tons).....      | 493,102                          | 505,003                          |
| Gypsum (gross tons) .....      | 332,345                          | 242,535                          |
| Gold (ounces) .....            | 15,006                           | 11,990                           |
| Bricks .....                   | 25,000,000                       | 23,000,099                       |
| Building stone (net tons)..... | 63,861                           | 45,500                           |
| Cement (barrels) .....         | 58,762                           | 44,529                           |
| Antimony ore (net tons) .....  | 1,403                            | 132½                             |
| Manganese ore (gross tons).... | **495                            | .....                            |
| Copper ore (net tons).....     | 2,471                            | 1,200                            |
| Drain pipe (feet) .....        | 300,000                          | 300,000                          |
| Grindstones (net tons) .....   | 350                              | 360                              |
| Copper (pounds) .....          | 12,320                           | 28,800                           |
| Moulding sand (net tons).....  | 190                              | 185                              |

\*Including imported ore. N. S. ore 30,575 tons.

\*\*All imported.

It will be noticed that coal, iron ore, coke, and however, was all imported, with the exception of 30,375 raised in the province. The decrease in gypsum, gold, and antimony will be referred to later.

The total revenue of the Mines Department was \$683,016.95. To this amount the royalty from coal

mines contributed \$616,933.66. Gold rentals brought in \$10,805.

During the fiscal year ending Sept. 30, 1908, the Government paid as a bonus on each ton of coal consumed in the manufacture of iron and steel in the Province the sum of \$65,294.48. The Dominion Iron & Steel Co., the Nova Scotia Steel & Coal Co., the Londonderry Iron & Mining Co. were the recipients of this bonus.

The returns of coal sold show that the principal increase was in the Quebec (St. Lawrence) trade, and in the New Brunswick and Newfoundland sales. A considerable falling off is apparent in the United States sales.

The returns of coal sold during the year 1908 show, compared with the returns of 1907, as follows:—

|                            | 1907.     | 1908.     |
|----------------------------|-----------|-----------|
| New Brunswick .....        | 427,128   | 510,331   |
| Nova Scotia .....          | 1,882,419 | 1,950,632 |
| Newfoundland .....         | 146,502   | 207,062   |
| Prince Edward Island ..... | 77,493    | 63,331    |
| Quebec .....               | 1,709,592 | 2,047,638 |
| West Indies .....          | 2,598     | .....     |
| United States .....        | 616,312   | 499,634   |
| Mexico .....               | 7,591     | 8,907     |
| Other countries .....      | 12,483    | 4,697     |
| Bunker .....               | 204,572   | 193,352   |
|                            | 5,046,690 | 5,485,583 |

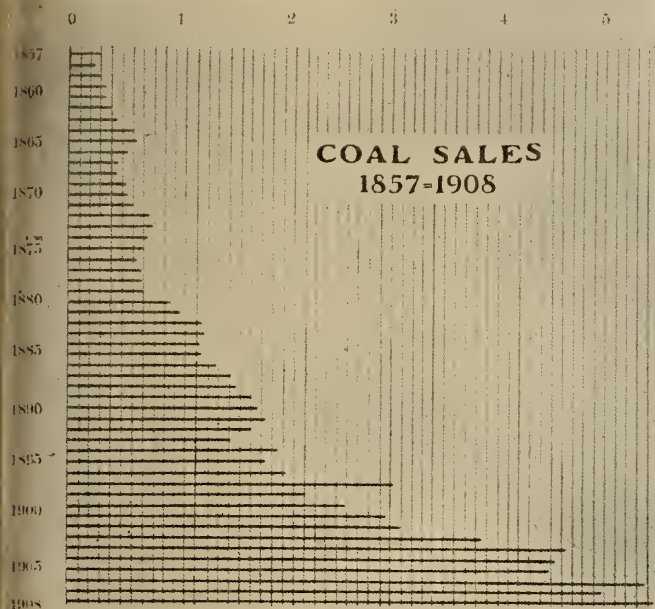
By counties the production was:—

|                          | Tons.     |
|--------------------------|-----------|
| Cumberland County .....  | 559,013   |
| Pictou County .....      | 777,217   |
| Cape Breton County ..... | 4,556,446 |
| Inverness County .....   | 402,655   |



### Collieries—Cape Breton.

**North Atlantic Collieries, Port Morien.**—The main haulage deep, which had 700 feet of water in it, was pumped out and extended 800 feet. Travelling road and levels were extended. Fifteen hundred feet of



double track were laid in the haulage deep. A half battery of Babcock & Wilcox boilers was installed at the main lodgment. The quantity of air in circulation is 30,000 cubic feet per minute. The workings of this mine are all submarine.

**Dominion Coal Company Collieries.**—It is out of the question to note all the changes and improvements in this company's collieries and plants. A few general notes must suffice.

Electric turbine pumps have been installed at Dominion No. 5. Extensive surface improvements have been made at many of the mines. It is pleasing to note the large amount of Canadian machinery that has been and is being installed. During 1908, Dominion No. 12 colliery was connected to Grand Lake by seven miles of railway. At all the collieries safety lamps, Ackroyd & Best and Marsaut are in use. Bulldog and excellite appear to be the principal explosives used.

At the **Nova Scotia Steel and Coal Company's Collieries**, Sydney, No. 1, No. 2, No. 3, No. 4 and No. 5, many improvements were made and outputs were increased. At No. 1 the output was 253,900 tons, in mining which amount 19,021 lbs. of powder was used. At No. 3 the quantity of 46,902 lbs. of powder was used in mining 299,374 tons of coal.

The **Mackay Mining Company** is a small concern which promises larger development. The mine has been wired for electric power, and an electric chain coal cutter is in use. The output is about 50 tons per day.

The **Colonial Coal Company** has a property once worked by the Toronto Coal Company. The mouth of the slope is less than 200 feet distant from the waters of Little Bras D'or. An extension of the I. C. R. will come within three-quarters of a mile of the mine. The old slope has been cleaned out and retimbered, and a

haulage road laid. It is expected that 200 tons per day will be shipped during the 1909 season.

**Sydney Coal Company.**—This mine output 5,000 tons in 1908, as compared with 3,000 tons in 1907. The mine is principally worked for local sales.

**Inverness Mine** has added to its equipment boilers, new machine shop, 40 miners' houses, 200 mine cars, and 50 new 30-ton railway cars.

The mine of the **Mabou & Gulf Coal Company, Limited**, was put out of commission on August 8th. The Government of Nova Scotia is now keeping the mine in safe condition.

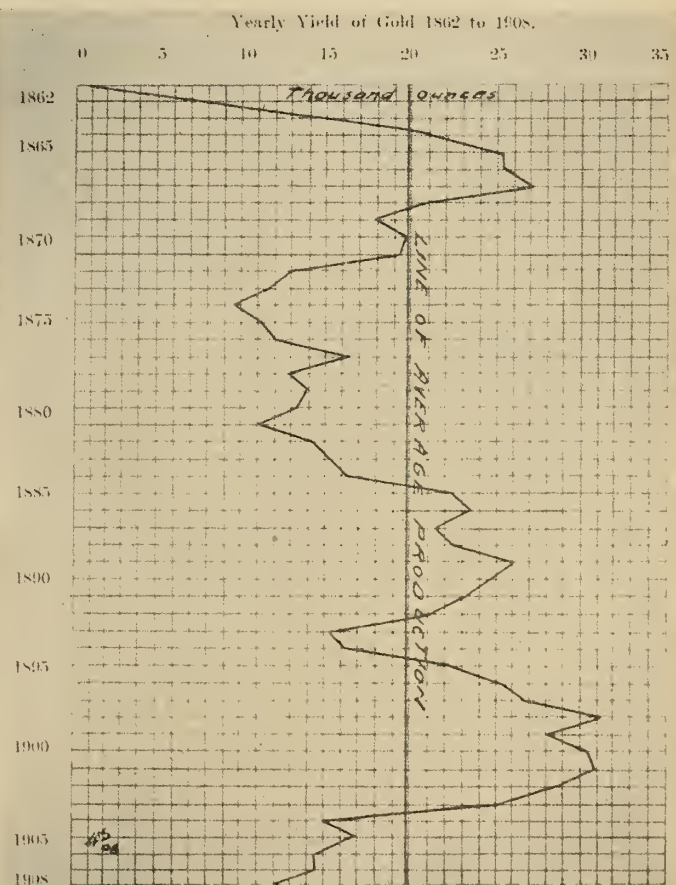
Improvements made at the collieries of the **Port Hood-Richmond Railway & Coal Company** have been noted before in these columns. Here the output has been brought up to 99,700 tons, an increase of 23,617 tons over last year. Safety lamps are in use, 300 Ackroyd & Best lamps being in stock.

### Cumberland County.

**Cumberland Coal & Railway Company's** Springhill collieries have had a good season. On No. 2 seam 1,800 feet of railroad and other pillars have been extracted at the 2,400-foot level to the rise. On other levels extensive work has been completed. On October 2nd the bench coal of No. 1 was struck. It was found to be more than four feet thick, of good quality, and free from stone and splint. Amongst other improvements, a new pumphouse has been erected level with the dams, and a Blake pump installed.

**Minudie Mine, River Hebert**, has worked continuously.

**Scotia Mine, Maccan**, was taken over by the Great Northern Coal Company of New York, on March 16,









In the "Deposits" column are entered the deposits made in the bank, and on the credit side is entered in the cash column the amount of cash deposited. In the "Discount" column on the Dr. side are entered discounts allowed to customers on the payment of their accounts. In the "Discount" column on the credit side are entered discounts received from creditors when paying to them the amount of their bill. In the "Cheques" column are entered all cheques issued against our bank account. At the end of each month the cash balance is posted to the debit of the cash account in the Ledger, and the bank balance to the credit of the bank account in the Ledger. The total of the discounts allowed is posted to the debit of discounts account, and the total of discounts received to the credit of discounts account. Opposite each entry in the Cash Book is the name of the other account affected by the transaction. If on the Dr. side the amount is posted to the credit of the account named. If on the Cr. side, the amount is posted to the debit of the account named.

To relieve the Cash Book from a mass of small items a Petty Cash Book is kept, a summary being made at the end of the month, and entered in the Cash Book in one entry. Many systems of keeping the Petty Cash are in use, but the following is perhaps the neatest and best: A cheque of say \$100.00 is given to the Petty Cashier, and then a cheque is given for the total amount of vouchers turned over to the Head Cashier, restoring the Petty Cash balance to the original figure. At all times the Petty Cashier must have on hand \$100.00 in cash or receipted vouchers. This system is called the Imprest System.

We will take up in the next paper the best forms for the Purchase Journal and Sales Journal as applied to mining. The foregoing discussion enunciates a few general principles of bookkeeping applicable to every form of undertaking, and it does not lose in value, because it does not bear solely on the mining industry. In the Purchase Journal, etc., important differences arise when they are applied to different lines of business. Therefore, while of no more value to the reader, the following article will be of more direct interest than the above.

## THE ELECTRO-METALLURGY OF IRON AND STEEL.

Abstract of a Lecture Delivered by Dr. Stansfield at McGill University Before the Members of the Canadian Mining Institute, 3rd March, 1909.

Dr. Stansfield's lecture, which was graphically illustrated by lantern views and experiments, was a terse and lucid sketch, tracing the main features in the development of the electric furnace with special reference to the electro-metallurgy of iron and steel. The following inventions were referred to as some of the principal steps in the first stage of this development.

1. **Acheson's Graphite Furnace** (1896), in which heat is generated by passing an electric current through a continuous carbon core for the purpose of converting anthracite into graphite. Though this furnace is a later invention for a special purpose, it illustrates the first principle of generating heat by the interposition of a solid resisting medium. This was practically demonstrated by passing a heavy current through a

stick of carbon, which was thereby heated to a white heat.

2. **Sieman's Electric Furnace** (about 1880). In this the charge is placed in a crucible between the opposing ends of two vertical electrodes the upper carbon and the lower metal fitted into the back of the crucible. This was the first application of any importance of the electric arc for heat production. Some copper was actually fused by this means before the audience.

3. **Moissan's Furnace**. A modification of the above principle, in which the arc, between two horizontal opposing carbon electrodes, is deflected down onto the charge immediately below it by means of an electromagnet placed beneath the furnace. By means of a most ingenious contrivance, invented by the lecturer some years ago for Roberts-Austen, the actual details of melting first copper and then iron by this process were reflected onto a screen much enlarged for inspection, forming a very neat, interesting and beautiful experiment.

To this point the furnaces had no special reference to iron or steel. Before proceeding to this stage in the development it was pointed out that while the cost of electric heat was very high (1 ton of good coal produces as much heat as 1.1-3 h.p. of electric energy per year), on the other hand the heat could be applied to the work in hand with far greater efficiency. In the electric furnace for every unit of heat used effectively about .5 unit is lost, in shaft furnaces the corresponding loss is about 1.6, in open hearth 3.1, reverberatory 7.5, and in crucible steel furnaces the enormous proportion of about 40 units is wasted.

The Canadian Government in 1903, recognizing the great importance to the Dominion of developing the smelting of iron ores electrically, appointed a commission, under Dr. Haanel, to investigate and report. Dr. Haanel, after visiting Europe, conducted some experiments at Sault Ste. Marie. These, together with investigations made by the lecturer and others, have demonstrated that, as compared with the usual methods of smelting and refining, electric furnaces (1) removed more of the sulphur and phosphorus, thus either giving a better quality of metal or enabling ores containing larger proportions of these impurities to be utilized, (2) could successfully heat ores containing a far higher percentage of titanium, (3) gave a denser and more homogeneous steel than even the crucible steel furnace.

The lecturer then proceeded to trace the steps in the next stage of the development, which has special reference to the production of iron and steel.

### A.—The Smelting of Iron Ores.

1. **The Heroult Furnace**. This, as used by Dr. Haanel for experiments at Sault Ste. Marie, consists essentially of a shaft, in which a vertical carbon electrode is suspended. The base of the furnace is lined with carbon, which forms the lower electrode. The length of the upper electrode limits the height of the shaft.

2. **The Turnbull-Heroult Furnace**. In this the shaft is higher, and the ore is conveyed at its base by inclined shoots to a smelting trough or canal, into which descend six electrodes, permitting the use of a three-phase current.

3. A Swedish modification, in which the gases from the top of the furnaces are conducted down to tuyeres placed on a level with the carbon electrodes, thus cool-



ing the latter and helping in the more rapid reduction of the ore.

### B.—STEEL FURNACES.

The chief processes used in the production and refining of steel are: (1) The open hearth, (2) the Bessemer, (3) the crucible process. It is only with the last of these that the electric furnace seriously competes, as its function at present is chiefly, as pointed out above, to produce the highest grades of steel, and not, as in the case of the first two processes, to produce large quantities of the lower grades cheaply.

1. **The Heroult Steel Furnace.** This has a shallow-hearth lined with dolomite. Two carbon electrodes descend through the roof nearly to the surface of the slag. An alternating current passes down one electrode through the molten metal and up the other electrode, thus forming two electric arcs.

2. **The Colby** is a simple induction furnace, consisting of a soft iron core, surrounded by an insulated primary winding, sometimes made of copper tubing, through which water is circulated for cooling purposes. In place of the secondary winding is an annular trough, which contains the metal, kept molten by the induced current.

These two furnaces were shown after the lecture in actual operation in the College Laboratory.

3. The next modification was practically a combination of two Colby furnaces, each with its iron core and primary winding belt so arranged that the annular troughs met in a central large chamber, thereby much increasing the capacity of the furnace. Additional iron pole-pieces, placed opposite this central chamber, served to give the additional heat needed at this point. The current being supplied to the pole-pieces from special secondary windings on the iron cores.

4. The latest improvement has been to substitute three-phase current for the two-phase, there being three iron cores, each with its primary winding and annular trough, connecting with the large central chamber. Pole-pieces are inserted between each pair of units. This furnace has been made to hold up to 8 tons of steel, and has the additional advantage of inducing a circulation in the molten metal, insuring more complete homogeneity.

Dr. Stansfield has recently written a book on "The Electric Furnace: Its Evolution, Theory and Practice," which those requiring more detailed information should consult.

D. B. LANGFORD.

## ELECTRICITY IN MINES.

By T. J. McKavanagh, Electrician, Cable SS. "Minia," Halifax, N.S.

Paper read before the Mining Society of Nova Scotia.

It is impossible in a paper of moderate length to go fully into comparative costs and economies; and I must be content with a review of what is generally accepted as the most modern and economical in the application of electricity to mining.

**Generating.**—Water power appeals most to those engaged in mining other than coal mining, and when within reasonable distance, and construction costs are moderate, is the most economical prime-mover. Occasionally a low priced steam plant is less costly than storage works to take care of the load peak in dry seasons; and there is ample evidence of considerable economy being affected by the use of steam in water-power schemes. Steam turbines of both the velocity and impulse types are superior to the reciprocating engine; the advantages being briefly low capital and running costs, small space occupied, light foundations, and in the matter of steam consumption, the low pressures admissible make easy the use of high superheat. Gas engines, favorably located, are slightly more economical than turbines at high load factor, but the turbine excels at the low load factor usually obtained in mining.

**Distribution.**—The mechanical simplicity of the induction motor, and convenience and economy in transmission, have brought the three-phase system into almost universal use. Underground safety, convenience and economy, in order given, must be satisfied and when reasonable care is exercised electricity is eminently satisfactory. Economy must not be lost sight of in our striving for safety; and an inexpensive cable, well installed, will serve better than an expensive cable in which the maker is supposed to have said the last word regarding safety.

Bitumen-insulated cables, lead covered and wire armoured, laid solid with bitumen, in wood or metal troughing, is common practice. The copper cores of such cables are liable to become decentralized when

carrying full load for long periods; and the wooden bridges and inferior bitumen filling often used are decidedly injurious to the lead cover and wire armour. Asphalt bridges and clarified bitumen are proper. Cheap and reliable is paper insulated bitumen sheathed cable laid solid in a mixture of good pitch and pitch-oil in wood or metal troughing.

Armoured cables carried in slings are much benefited by occasional applications of bitumastic paint, and when the protective materials are well compounded, may be laid direct in ground or, better still, in a trench of puddled clay.

The desirability or otherwise of "grounding" the armour of cables has often been dealt with, and we are certain that "grounding" in practice does not afford protection against shocks. This is not because of "grounding," but owing to the great difficulty in the way of providing reliable "grounding," and in the sense of security felt in some "grounds" which are liable to become seriously affected by changes in the strata. "Grounding" of the armour is the immediate cause of many types of bad faults, and owing to the great uncertainty of "grounds" in dry mines, danger from shocks is perhaps best guarded against by using no "ground."

Fully ninety per cent. of the faults in direct current systems can be obviated by using concentric cables in which the inner wire is negative. Cables bunched together should be suitably protected to prevent flame spreading in the event of a cable breaking down. Asbestos strips about three inches wide, and three-sixteenth inch thick, soaked in a solution of silicate of soda and wrapped on the cable while soft, afford excellent protection.

Three-phase cables (6,600 volts), paper insulated, lead covered and double wire armoured, are in a recent installation carried down shaft by means of wooden cleats bolted to channel irons let into wall. The same



type of cable is in another instance carried down shaft a pitch-pine casing. The casing has a groove slightly less than the diameter of the cable, and the cable is jammed home and a pitch-pine cover screwed on. Mechanically this method to take weight of cable is good, and the necessity for armoring is evident; but the fire risk is greater than in the former method; and an overloaded cable would more readily break down owing to the heat insulating properties of the wood.

**Switches and Motors.**—Switches must be gas-tight, and when not of the oil-brake type, should be flame-tight if placed where not in the path of downcast air current. Excepting oil-break switches, no switch is proof against the lighter gases, and when not favorably placed they must be able to withstand the shock of internal explosion, and by means of wide joint faces, cool the escaping gases to make external ignition impossible. A switch much used in surface work, having two blades hinged at one end and held together at the other end by a bar of insulating material carrying a handle and metal stubs and screws, has recently been condemned. An operator opening a motor switch received fatal shock through his little finger touching one of the screws. The current was alternating 250 volts. At least four healthy persons received fatal shocks from 200 volts alternating current system during 1907. Six thousand volt cables are safe.

Direct-current motors with interpoles and fixed brushes, at all loads are sparkless, and indeed excellent; but cannot equal the performance of induction motors which have worked without harm when submerged. Tests on flame-proof motors have proved them worthy of the name; but at coal-faces where gas-blowers are frequent and ventilation difficult, compressed air presents fewer risks and should be used.

**Applications.**—The electric motors have considerably influenced the design of mining pumps, and the centrifugal pump direct driven by an induction motor has no peer in mechanical and low first cost. Owing to the perfect balancing in turbine pumps, and the constant turning effort of the electric motor, heavy foundations are not required for this type, and the small space required is often a considerable advantage. It cannot now be objected that the centrifugal pump is confined to low heads: a head of 1,650 feet has been overcome by two inter-connected electrically driven pumps handling 1,540 gallons per minute.

At Lindall Moor mines, three stage vertical sinking pumps direct-coupled to 315 b. h.p., 3,000 volt motors, and running at 1,480 r.p.m., handle 1,000 gallons per minute against total head of 780 ft. Combined efficiency of motor and pump seventy-three per cent. Some makers claim eighty-five per cent. as combined efficiency of direct-driven pumps.

Vertical type motors, direct-coupled to centrifugal pumps, and the pumped water taken round the motor case for cooling purposes, are being successfully used.

**Drills.**—Electric percussion drills operated by solenoids, taking current from a low frequency two-phase generator, or operated by motor placed on top of drill chamber, are well taken up despite much adverse criticism by air-drill makers and users.

A novel combination of motor, compressor and drill, lately introduced, has many good points, and a large number of complete outfits are in successful operation. The compressor is a valveless, duplex, single-acting machine, and two short lengths of hose convey alternate impulses of air pressed to about 40 lbs., to a special type of air-drill. There is no exhaust, and the air car-

ries atomized oil which lubricates the drill compressor pistons. A 5 h.p. motor-compressor equipment is equivalent to a  $3\frac{1}{4}$  inch air-drill working at 100 lbs. pressure.

The motor and compressor are mounted on a small trolley suitable for mining gauges, and the alternate current motor equipment weighs 730 lbs. with 60-cycle motor, and 820 lbs., with 30-cycle motor, and the direct current motor equipment weighs 883 lbs. Drill weight, 288 lbs.

**Coal-cutters.**—Electrically driven coal-cutters make satisfactory progress, and when compressed air is used with coal cutters, considerable economy can be effected by the use of electrically driven portable air compressors, owing to the short pipe lines and smaller compressors, impossible when steam is used. A motor compressor having 4 cylinders disposed radially in a circular cast-iron casing, and capable of dealing with 120 cubic feet of free air per minute, and delivering at 80 lbs. per square inch, has a base 3 ft. by 2 ft. 6 in. extreme width at end of motor bearing 4 ft. 9 in. and height of 4 ft. 6 in.

**Ventilation.**—Fan driving is now entrusted to the electric motor, and at Durham Colliery a 55 inch double-inlet service fan, with a capacity of 145,000 cu. ft. per minute against  $2\frac{1}{2}$  inch water gauge, is driven by a 2 speed induction motor of 62.5 and 125 b. h. p. running at 183 or 365 r. p. m. as required.

**Haulage.**—Main and portable haulages are most economically and conveniently operated by electricity; and where conditions permit of its use, the electric locomotive is rapidly displacing the mule and compressed air locomotive. In coal gathering from the face, the electric locomotive is particularly useful and economical; and perhaps there is room for the storage battery locomotive in this class of work. Storage battery locomotives with flameproof motors and oil type switches are not burdened with overhead wires, rail return and sparking trolley, and should find favour where sparking is objectionable. Electrically driven conveyors carrying coal from the face to the gate, are extensively used, and great saving is claimed for them when working thin seams.

**Winding.**—While it is admitted that the modern steam winding engines are excellent, and that in winding, electricity has a formidable rival; nevertheless, electric winding is the more economical, and decidedly so, when working deep mines or where it is possible to supply a number of mines from a generating centre. Several systems have been tested in every-day working on the continent, and we now have sufficient information as to their merits and demerits, and their economy as compared with steam.

We will now deal with a system which has proved satisfactory, and the best of its class, and figures from a representative installation will give an idea as to the sizes of the machines for a given duty. A Koepe pulley having a diameter of nearly 10 ft. is used, and the haulage speed is 33 ft. when motor makes 64 r. p. m. Hoists 492 tons in eight hours from depth of 2,625 ft. Current at 1,000 volts, 44 cycles per second, is supplied to a 250 h.p. 3-phase motor. Directly coupled to this motor is a direct-current generator of 650 k.w. capacity at 500 volts, when running at 285 r. p. m. On the same shaft, between the motor and generator, is a fly-wheel of cast steel, 13 ft. in diameter, and weighing about 40 tons.



The winding motor is a separately excited, direct-current machine, rated at 320 h.p., 64 r. p. m., and taking current at 500 volts from the direct-current generator of the flywheel set. It is able to take an overload of 45% for 30 minutes, and 100% for five minutes.

The working of the system is briefly thus: The flywheel-set being running, exciting current is applied in progressive steps to the fields of the generator and haulage-motor, thereby causing the voltage of the generator, and the speed of the motor, to increase progressively.

At this, the accelerating period, the haulage-motor demands about 615 h.p., but no abnormal demand is felt at the generating station; the kinetic energy of the flywheel supplementing the induction-motor and enabling the generator to give up the required energy. The power required at full speed is very small, and the power supplied by the induction-motor is absorbed by the flywheel in regaining its normal speed, reduced when the heavy load came on. The power-demand on the generating station is practically uniform, and is only the normal rating of the induction-motor.

While stopping, the exciting current of the generator field is interrupted, and that of the motor increased. The counter emf. of the motor, now driven by the inertia of the moving masses, greatly exceeds the emf. of the generator, and the motor gives back current to the system and at the same time acts as a brake, giving smooth and quick retardation. While winding, should the 3-phase supply be interrupted, the inertia of the flywheel is sufficient to ensure winding for some considerable time.

The speed variations of the flywheel-set lie between 490 and 432 r. p. m. In a series of tests of this system, a winding-drum of 12 ft. diameter and weight of 16 tons, direct-coupled to a motor running at 150 r. p. m., was used (the ropes being removed), and it was found possible to change from full-speed in one direction to full-speed in the opposite direction in  $3\frac{1}{2}$  to 5 seconds.

A system but recently brought to notice bids fair to supplant the former system, and without doubt its operation is very simple and economical. It is known as the Thury direct current series system, and while it may or may not have been applied to winding, its suitability is evident, and the successful operation of the generators and motors involved is beyond doubt. Here we have a direct series generator in the generator station, and further, the generator-shaft carries the flywheel.

A direct-current series motor is coupled to the winding-drum, and starting, stopping, reversing and breaking are all easily controlled by one lever that directly, or through gearing, shifts the brushes on the motor. No switches or rheostats are required in the motor-room, and the generator-switchboard surprises one used to 3-phase switchboards. In fact, switchboards are not required; a pedestal carrying a double-pole switch, ammeter, and voltmeter, being sufficient.

Excepting for stops of considerable duration, the brake need never be applied; the single control-lever puts brushes in neutral position, and the motor is held at rest for any length of time, provided generator is running. The speed of winding can be fixed at certain predetermined limits by aid of a centrifugal governor, acting directly on the brushes, and suitable devices ensure smooth retardation and prevent overwinding.

As in the former system, the flywheel is called upon to assist at acceleration periods; but here the generator must be capable of standing overloads, and the prime-

mover need only be large enough to cope with the mean load. The factor of this system is large. There are no fuses, no circuit-breakers, no small wires, and no multiplicity of small exciting and switch motors, and accident to the prime-mover will not result in immediate shutting down of the system. With sufficient flywheel effect and prime-movers aggregating 1,000-1,200 h.p. winders absorbing 9,000 to 12,000 h.p. can be satisfactorily operated.

Long-distance, high-tension transmission systems delivering current at 60,000 volts to series motors coupled to 3-phase alternators, are being operated successfully, and this is the system of transmission to be used in the Victoria Falls scheme.

### UTILIZATION OF SCRAP TIN.

Outside of the direct production of tin from the ore there is in Europe, and especially in Germany, a great quantity of tin regained from scrap tinned sheet. The amount of scrap tin thus treated in Germany is about 30,000 tons a year. This is mostly done by electrolytic processes, the coated tinned iron or steel being placed in an iron basket, which is used as the anode of a powerful electric current, and plunged in an 8 to 10 % solution of soda lye. The tin is deposited in a spongy form on the cathode; the resulting mass is washed, compressed and melted. As the scraps as a rule have on them only about 2 to 3% of their weight in tin, we can put the amount of pure metal thus gained at about 600 to 900 tons per year. The most important works of this kind are in Essen, on the Ruhr—principally famous as being the seat of the Krupp parent establishment.

R. G.

### DESCRIPTION OF SAFETY CATCH IN USE AT N. S. S. & C. CO., SYDNEY NO. 1. COLLIERY.

(From the Report of the Nova Scotia Department of Mines.)

Fig. 1 shows the general arrangement of auxiliary safety catches used in connection with the coal cage. They are known as Walker's detaching hooks. The hook failing to hold the cage in case of an overwind, it is the intention that the cage will drop back and be caught at four points by the catches marked A. Two of these engage, at each end of the cage, the top band of the cage. The handspring T keeps an inward tension on these catches within limits that may be adjusted by the stop marked S, arranged so that the cage is always free to be drawn in an upward direction through the catches; but once having passed through, the close together and prevent the cage from coming back.

Fig. 2 shows safety doors used in connection with the Walker hooks on man shaft No. 1 colliery. The doors are placed about four feet below the bottom of the cage, when the Walker hook has engaged the hawse pipe.

The doors are built of 3-inch hardwood, completely covered on the bottom and around the edges with steel plate, forming a smooth surface with the tackling chain of the cage to work against. In the event of an overwind, these doors are forced open by the chain and cage passing through, and are closed by means of a spring. This design can be used only where centre spears and buntons are used.

Fig. 3  
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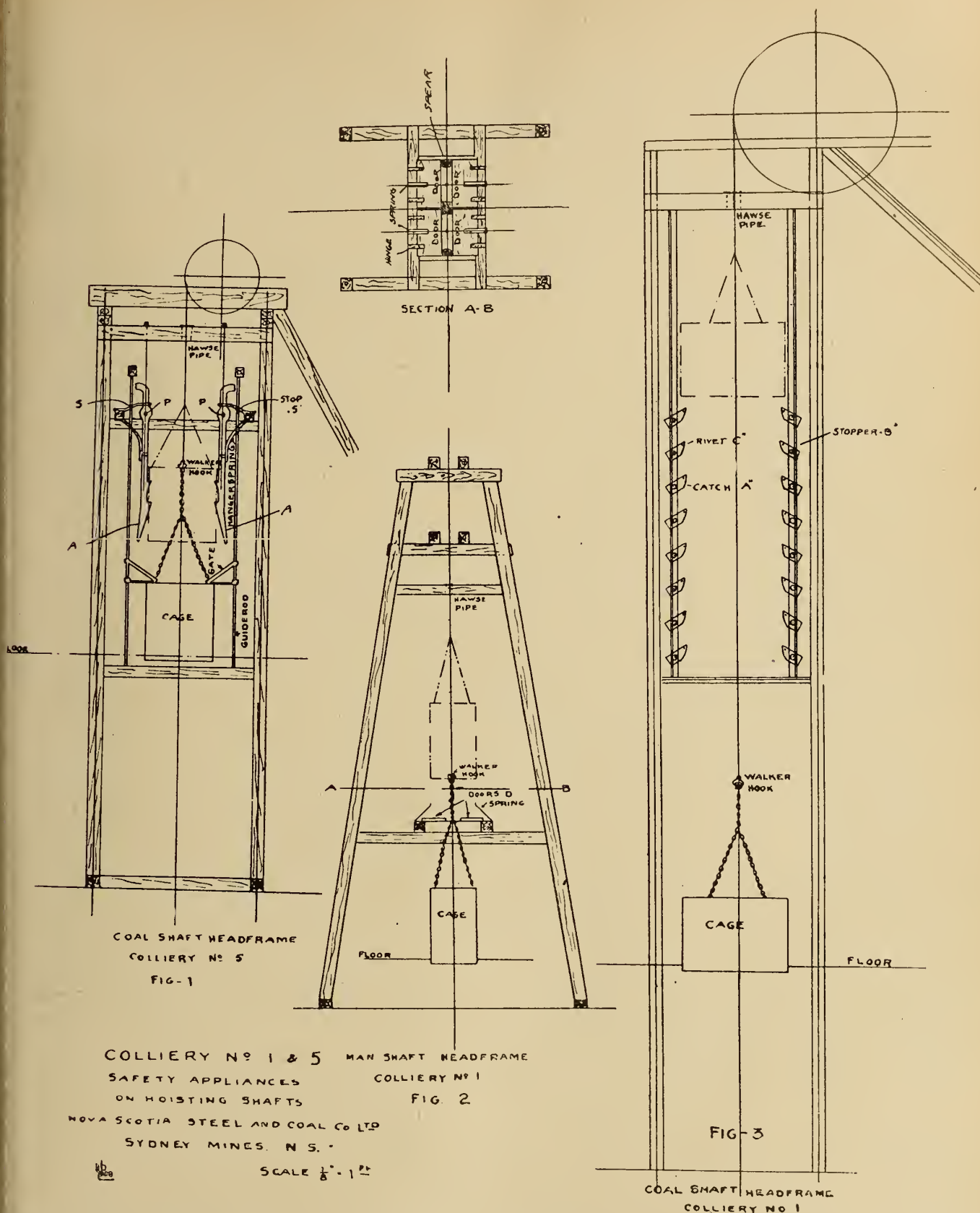


Fig. 3 shows the safety catches used in connection with the Walker hooks on coal shaft at No. 1 colliery. Eight forged steel-patches are placed in a vertical position in the centre of each end of the cage and spaced about three feet apart, vertically. They are supported between two 4 by 6 by 3/4 inch angle irons fastened in

a number of places to the head frame. The catches are steel forgings hung by the pin, and are prevented from turning over the centre by means of a rivet marked C, and take the weight off the cage by means of stopper B.

JOHN PRESTON.

**THE SLICKENSIDES LETTERS.**

Cobalt, Ont., Oct. 20th, 1908.

Mr. Geizhals, Toronto:

Dear Sir,—According to instructions, I examined your claim on the Boomflats, and report as follows: I reached your claim after a perilous passage in a canoe and effected a debarkation. I found that there were some unusual geological features presented, and therefore considered it advisable to return and secure the services of the eminent foreign expert and scientist, Mr. Lugenpeter. I was fortunate enough to find Mr. Lugenpeter free for a few days, and he returned with me at once to the claim. I am indebted to him for the scientific portion of the report. The practical suggestions are my own. Mr. Lugenpeter, however, authorizes me to state that he fully concurs in them.

We found that the claim consisted mainly of rock, which the local expert called "awful fine diabase," but Mr. Lugenpeter did not have such a high opinion of it, as he explained the acid edge was lacking, and, in fact, the basic properties predominated. He therefore did not consider the chances so good.

I would advise you to refer to Mr. Obalski's paper entitled "La Probabilite de trouver des Mines."\* The whole theory of prospecting is embraced in this, and it is expensive to acquire the same knowledge practically. Mr. Lugenpeter, although urged, would not state definitely what the "Probabilite" was in your case. The rocks, which Mr. Lugenpeter pronounced a "metamorphosed gabbro with phenocrysts of amphibole," contained a number of cracks or seams, which were filled mainly with mud. The local expert pointed out some calcite of a fine quality, but we were unable to see any silver. It was an off day for silver evidently.

The workings consisted of a hole or incipient shaft about 10 feet deep. This would be dangerous for rabbits, but otherwise will not do any harm, provided it is not extended any farther vertically. I would suggest that you have some poultry netting put round the shaft to keep things from falling in. There is nothing in the shaft now, and it would be a pity to see anything go into the hole.

Mr. Lugenpeter would not accept any direct remuneration for his services, except the actual expenses. He is, however, profoundly interested in the establishment of a fund to found an institution to teach prospecting solely. He leaves the amount of the fee you will pay to this fund entirely to yourself. No doubt the sum you decide on will be in keeping with the highly illuminative and valuable opinions quoted above. As soon as the fund has accumulated sufficiently, the institution to teach La Probabilite de Trouver des Mines au nord de la Province d'Ontario will be founded. I remain,

Yours faithfully,

J. M. SLICKENSIDES.

\*Paper read at the Quebec meeting of the Canadian Mining Institute, 1906.

Toronto, November 15th, 1909.

Mr. Geizhals, Toronto.

Dear Sir,—Subsequent to the date of my report of October 20th, Mr. Lugenpeter communicated with the well-known authority, Dr. Bartyrllowell, whose abstruse writings on the aplitic phase of the diabase have excited so much interest among prospectors. Mr. Lugen-

peter, with the true modesty of science, was quite willing to concede Dr. Bartyrllowell a place among scientists fully equal to his own. He considered that every respect Dr. Bartyrllowell was entitled to render with him.

Dr. Bartyrllowell fully concurred with Mr. Lugenpeter in the opinions expressed above. I consider therefore, that this settles the matter entirely, and there is no doubt about the report being correct and final and conclusive in every respect.

Yours truly, J. M. SLICKENSIDES.

**BOOK REVIEWS.**

**Clays, Their Occurrence, Properties, and Uses. With Especial Reference to those of the United States. By Heinrich Ries, Ph.D., Professor of Economic Geology in Cornell University.**

**Second Edition Revised—8 vo, xix+554 pages, 11 figures, 44 plates. Cloth, \$5.00 (21 shillings, net) John Wiley & Sons, New York. Chapman & Hall Limited, New York. 1908.**

Whilst Dr. Ries' object is to treat his subject particularly from an American (United States) point of view, more than half of his volume is composed of information that is of general application. In the first four chapters, comprising 311 pages, the following topics are discussed:—Origin of Clay, Chemical Properties of Clay, Physical Properties of Clay, Kinds of Clays, Methods of Mining and Manufacture. The remainder of the book is taken up with a detailed account of the distribution of clay in the United States, including many chemical analyses and useful geological observations.

The former chapters are, therefore, the more important to the Canadian reader.

In Chapter I. is given a careful elaboration of the origin of clay, the weathering processes involved, kaolinization, residual clay, kaolin, mechanical changes, chemical changes, consolidation, concretions, and other kindred phases in the formation and history of clay deposits. It is impossible here to note many of the features of this chapter. Dr. Ries' classification of clays, however, is worthy of special attention. The following are the main heads of his scheme:—

- A. Residual Clays. (By decomposition of rocks *in situ*.)
- B. Colluvial Clays, representing deposits formed by wash from the foregoing and of either refractory or non-refractory character.
- C. Transported Clays—
  1. Deposited in water.
  2. Glacial clays.
  3. Wind-formed deposits.
  4. Chemical deposits.

Dr. Ries' gives this classification in much more detailed form than the above. His scheme is, we believe, the most satisfactory and least arbitrary one that has yet been offered.

Chapter II., entitled "The Chemical Properties of Clay," is an excellent resume of functions and importance of the essential and incidental constituents of clay. The interpretation of ultimate chemical analyses is thoroughly discussed. Rational analyses, which have for their object the determination of the percentage



the different mineral compounds present, are explained; and the two methods are correlated. For both methods the laboratory routine is given. The effect of each mineral constituent upon the process of manufacture and upon the finished article is carefully explained.

"Physical Properties of Clay" is the title of Chapter III. Here such qualities as plasticity, texture, tensile strength, fusibility are defined and discussed. In both Chapters II. and III. the bearing of chemical and physical investigation upon the commercial value of clay is constantly kept before the reader.

Chapter IV. defines the different varieties of commercially valuable clays, and describes methods of mining and manufacture.

The remaining chapters deal with the geology and distribution of the clay deposits of the United States. Many of these deposits are, of course, closely related to neighbouring Canadian occurrences.

Dr. Ries has carried into his work a large and compelling enthusiasm. Whilst his capacity for minute and painstaking observation is obvious, it is also clear that he has grasped the economic philosophy of his subject. Hence his book is unquestionably profitable to all those who seek a wider knowledge of the possibilities of the clay industry, an industry that should presently attain large proportions in Canada.

#### PERSONAL AND GENERAL.

Mr. O. B. Smith, superintendent of the Granby mine, has gone on an extended trip to California.

Mr. R. B. Watson, general manager of the Nipissing Mines Co., was in New York recently on company business.

Dr. J. E. Woodman, of Dalhousie University, Halifax, has been appointed professor of geology in the University of New York.

Mr. E. E. Musgrave, general agent for the Tyee Copper Co., of Ladysmith, B.C., is in Mexico arranging for purchases of ore for shipment to the Tyee smelter.

Mr. A. J. McMillan, managing director of the Le Roi, has returned from London, England, where he attended the recent annual meeting of the Le Roi Mining Co.

Mr. W. A. Carlyle, consulting engineer of the Le Roi, is leaving for England to confer with the directors regarding the proposed exploration and development of the mine.

Mr. A. B. W. Hodges, general superintendent of the Granby Company, has been on an extended trip to Arizona and Mexico, where he inspected several of the large smelting plants.

Mr. Walpole Roland, consulting mining engineer, Port Arthur, Ont., who met with a serious accident about two months ago while engaged in professional work, is nearly recovered from his injuries.

Mr. A. B. W. Hodges, general superintendent of the Granby Company, and Mr. R. H. Stewart, manager of the mines of the Consolidated Mining and Smelting Co., have been interviewing the B. C. Government regarding some changes to be made in the code of mine signals now in use.

The following gentlemen were elected to membership at the regular March meeting of Council, held on the 2nd instant:—

Members—J. Austen Bancroft, McGill University, Montreal, Que.; J. L. Coulson, M.E., 186 Beverley

Street, Toronto, Ont.; James M. Macoun, Geological Survey, Ottawa, Ont.; James McGregor, Inspector of Mines, Box 668, Nelson, B.C.; Armand Mosco Vici, Box 544, Montreal, Que.; Horace G. Nichols, M.E., Ymir, B.C. Prof. Wm. Nichol, Queen's University, Kingston, Ont.; Sydney Smith, General Manager Duchess Silver Mining Co., Cobalt, Ont. formerly associate member); R. B. Watson, M.E., care Nipissing Mining Co., Cobalt, Ont.; R. P. D. Graham, Montreal, Que.

Associates—A. W. English, Giroux Lake, Ont.; M. Gallagher, Standard Explosives, Ltd., 132 Board of Trade Building, Montreal, Que.; Alfred McMillan, Rossland, B.C.; Chas. A. Smart, 33 Sussex Avenue, Montreal, Que.

#### CORRESPONDENCE.

To the Editor Canadian Mining Journal:

Dear Sir,—I read with interest your editorial comment on Mr. Corkill's report for the Ontario Bureau of Mines, in which special reference was made to the undue prevalence of accidents in the Cobalt district. The question of the accident rate in mines is one of such wide importance, from the humane as well as the economic point of view, that on exchange of data and experiences between various mining fields may prove of service, even when the conditions obtaining may appear fundamentally dissimilar. Upon the Rand gold fields, which employ 185,000 men, 700 to 800 annually lose their lives through mining accidents. This high rate of 4 per 1,000 is largely due to the great number of native labourers employed. The advantage of placing men of good technical qualifications even in the lesser positions of control has been evinced during the last year or two by a remarkable advance in underground efficiency and decrease in costs. But the change, the application of engineering principles and other organization where all was previously under the careless direction of the rule-of-thumb man, has also had its marked effect on the accident rate. The figures for 1907 and 1908 (the latter year essentially one of high pressure work) compare as follows:—

| Men Killed Owing to—      | 1907. | 1908. |
|---------------------------|-------|-------|
| Fall of ground.....       | 197   | 204   |
| Explosives . . . . .      | 280   | 209   |
| Other accidents . . . . . | 333   | 299   |
|                           | 810   | 712   |

There was thus a decrease of 100 in the fatalities in 1908, although there were 10,000 more men employed. The influence of the more capable and scientific supervision is further indicated by the large decrease of accidents due to explosives, which class of mishap is above all others attributable to carelessness or inefficiency.

The current half year is unfortunately destined to show an unfavourable record owing to the flooding disaster at the Witwatersrand mine, by which 125 men lost their lives. But it is most probable that the rate will show a steady decrease in future under the better systems of supervision being gradually established.

Yours faithfully,

RALPH STOKES.

Eckstein's Central Administration, Johannesburg S.A., Feb. 20th, 1909.



Bridgewater, N.S., March 8, 1909.

Editor of The Canadian Mining Journal, Toronto.

Dear Sir,—In answer to the questions of Mr. J. D. Ramsay in your issue of March 1st, I beg to reply as follows:—

I stated that I objected to the conclusion of Prof. Haultain that free-milling gold ores in general could be valued more accurately by assaying than by mill-test.

I also stated that in my remarks I referred particularly to the free-milling gold ores of Nova Scotia.

I am not familiar with the Rand ores; but I can hardly believe that even with them an assay is more accurate than a mill-test, provided, of course, that the samples for both are taken with the same degree of accuracy. I may say that my sampling has been done carefully and systematically in all cases.

Of course, the gold is unevenly distributed through the veins. There are very few free-milling gold ores in the world where the gold is not so distributed.

Yours truly, E. PERCY BROWN.

### IMPRESSIONS OF COBALT.

To the Editor of the Canadian Mining Journal:

In the "London Mining Journal" of February 6th "an occasional correspondent" has an article under the above heading, his second impressions after a two weeks' stay in the camp. Naturally, after so short a visit, especially in the winter when the snow lies heavily on the ground, a man is more than likely to get certain false impressions.

He says in speaking of the Keewatin: "This formation, then, is far from hopeless, as was at one time imagined; certain veins in passing into the Keewatin from conglomerate or diabase have at first suffered impoverishment, but on further exploration have regained their valuable contents." This correspondent has been misinformed. The Keewatin was never

thought to be hopeless. From the early days of the camp certain productive veins have been known to occur in the Keewatin. The correspondent is quoting others, rather than recording his own observations, when he says that certain veins which have suffered impoverishment on passing into the Keewatin, from conglomerate or diabase, have again regained their valuable contents. To quote again from the article: "In the central portion—notably in the O'Brien and Nipissing—there does not seem to be any favor evidenced for either conglomerate, diabase, or Keewatin; farther east it is reported the Drummond mine in passing from diabase to Keewatin changed for the worse, whilst the Nova Scotia had a direct reversal, being greatly benefited." While the O'Brien has good veins in both the conglomerate and diabase, it may be asked what percentage of the output has come from the Keewatin? The Nipissing has had one good vein in the Keewatin but the great majority of their numerous veins have been in the conglomerate. The Drummond vein was in conglomerate, and not in diabase. The Nova Scotia vein is in Keewatin at the surface, and passes downwards into a diabase sill.

The article has the following sentence: "Personally, from what I have recently seen, I should consider the Montreal River section quite equal to duplicating the present output of the Cobalt section." Mining men are frequently accused of being optimists; this correspondent is certainly one. Whatever may be the future of the Montreal River section, there is nothing to lead one at present to say that it will duplicate Cobalt in silver production.

Doubtless the correspondent has intended in his article to give readers of the "London Mining Journal" a fair and unbiased account of the Cobalt camp from impressions which he has gathered. The article is simply an illustration of the kind of stuff with which the public is fed during a mining boom.

Yours, etc.,

READER.

## INDUSTRIAL PAGE.

### AN INDUSTRY WITH TRADITIONS BEHIND IT.

The B. Greening Wire Company, Limited, Hamilton, Ont., has issued a large illustrated catalogue. In a prefatory historical note much matter of interest is given. Very rarely in this country can the family history of the heads of an enterprise be traced back for several centuries. The Greening family, however, since the year 1600, has been connected with the wire and allied industries.

It is on record that about 1600 A.D., at Tintern Abbey on the Wye, pins and needles were manufactured by a member of the Greening family. In the year 1799 Nathaniel Greening, at the age of 20, went to Warrington from the Tintern Abbey wire mills, and there established a business in wire drawing on Bridge Street, near the site of the present Lion Hotel. A few years later the firm of Greening & Rylands was formed. This concern lasted until 1840, when the partnership was dissolved. Mr. Greening then took his sons into business under the firm name of N. Greening & Sons.

The late Benjamin Greening, second son of Nathaniel Greening, had served a seven years' apprenticeship with Greening & Rylands as a wire drawer. On the

completion of his apprenticeship he commenced business for himself, and continued until 1858. He then removed to Canada, and became one of the pioneers of the industry here. Under the firm name of B. Greening & Co. he carried on the enterprise successfully until his death in 1877. His son, S. O. Greening, succeeded him and added largely to the works. In 1889 the B. Greening Wire Co., Limited, was incorporated as a joint stock company. Since that time important additions have been made annually to the plant and equipment. In 1907 very extensive additions were made, including an entirely new weaving mill and plant of the finest description.

The Greening catalogue contains detailed descriptions of the various grades and kinds of wire cloth for screening, milling, bolting, fanning mill use, etc., etc. Perforated metals, brass and copper wire cloth, window guards, steel wire chains, and numerous other articles are listed, with full specifications, in the catalogue. Mining men will find the pamphlet useful in their offices.



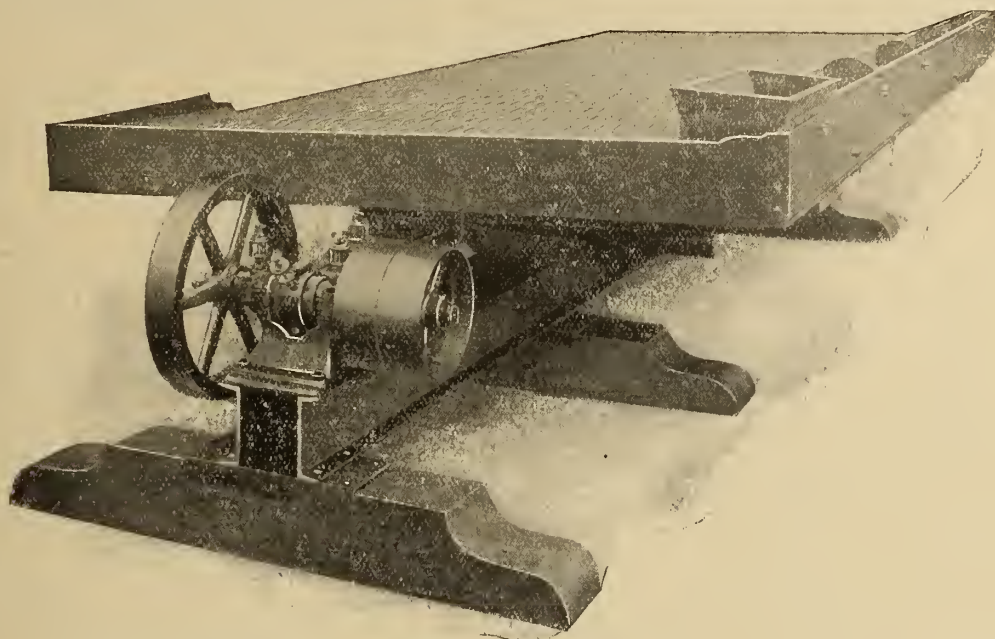
### THE HENNIG ORE CONCENTRATOR.

Reference was made in the Canadian Mining Journal of March 15 to the Hennig concentrating table. Through the courtesy of the manufacturers, the Ore Dressing Machinery Co., 114-118 Liberty Street, New York, we are enabled herewith to reproduce several cuts that will illustrate the principles and working of the table.

The driving gear is in one piece, and includes fast

crosspieces made of 8-inch by 8-inch timber, and resting on these crosspieces are two 9-inch channel bars. The table proper rests upon the two crosspieces, the four corners of which are fitted with short steel pins that have ball ends. These pins work freely in sockets fitted to the ends of the crosspieces on the bottom of the table.

Fixed rigidly to the channel bars are the crosspieces, and projections from the crosspieces work freely be-



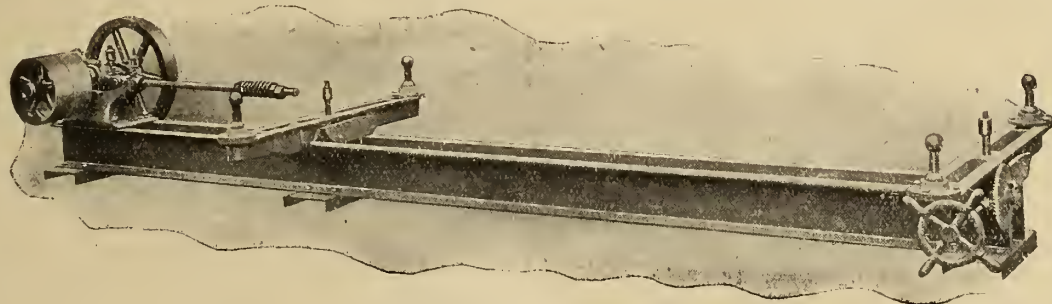
THE HENNIG CONCENTRATOR.

and loose pulleys, balance wheel and double eccentric drive. Three-quarter horsepower is required to drive the table. The longitudinal oscillations may be varied from nothing up to 15-16 inch. The rate of the oscillations range from 150 to 180 per minute.

The Hennig table is provided with a total length of 1,256 feet of riffles. Each riffle is made up of semi-circular metal strips. Each metal strip is 5-6 inch wide and 3-16 inch high, except when flattened. At the feed

tween guides attached to the bottom of the table. The guides may be set at any angle with the line of the driving rod, thus giving the required amount of side motion. From the ball-and-socket arrangement mentioned above a rocking motion may be imparted. Thus these three motions, longitudinal, side, and rocking, reproduce closely that of the orthodox prospector's pan.

The feed trough is 15 feet 7 inches long, 3 inches high, 8 inches wide at the feed end, and 3 inches wide



SUBSTRUCTURE AND DRIVE.

and of the table the distance between the riffles is 3 inches, while at the discharge end it is only  $\frac{3}{4}$  inch. These figures vary according to the requirements of the ore under requirement.

The riffles are flattened as the discharge end of the table is approached, and are arranged in sinuous curves.

The foundation of the table consists of three 5-foot

at the discharge end. Adjustable gatelike strips divide the trough into five compartments, leaving spaces anywhere from 1-10 inch to 5-16 inch. The pulp is fed onto the table through holes placed  $2\frac{1}{4}$  inches apart in the outer side of the feed trough. At the feed end of the table these holes are  $\frac{3}{4}$  inch in diameter. Those at the discharge end are only  $\frac{3}{8}$  inch. The feed trough is capable of adjustment to within 0.001 inch.





TABLE AND FEED TROUGH.

The ore is allowed to pass into the wide end of the trough at the head of the table. The gates being adjusted, a concentrating effect is obtained by the grooves in the bottom of the trough. With proper adjustment 90 per cent. of the concentrates should be made in the trough, only the balance of the pulp passing over the table. The curved riffle and the gyratory motion cause the pulp to be washed within the arc of every small curve continuously over the entire length of every riffle. The average capacity of the table is about 50 tons in 24 hours.

Messrs. Jones & Glassco, of Montreal, who have been introducing Renold chains into this country, have been meeting with splendid success. The J. R. Boot Paper Company have ordered four main drives from motors 75 horsepower each. This firm has already had a Renold chain running night and day for three years which shows no sign of wear. The Wire and Cable Company have ordered twelve of the drives, and several orders have been filled for single drives. The Bell Asbestos Mine has recently installed one of these drives to replace gears on a locomotive.

## SPECIAL CORRESPONDENCE

### NOVA SCOTIA.

**Free Coal.**—The new U. S. tariff provides for free entry of coal, with an "if," and as usual an important "if." Uncle Sam is given to making offers in the subjunctive mood. Canada should know that by this time. The following figures will bear study. In the twelve months of 1908 the Dominion of Canada produced 10,511,426 tons of coal. She consumed 20,714,821 tons, or twice as much coal as was mined in the Dominion. The deficiency between her coal output and consumption was made up from the coal fields of the United States. It is usually supposed that the bulk of the coal importations into Canada from the United States consist of anthracite coal, which cannot be produced in Canada, because we do not possess anthracite coal fields. This is a comfortable belief, but what are the facts? The coal imported into Canada from the United States amounted in 1908 to a total of 10,203,395 tons. Of this amount 7,084,130 tons, or approximately 70 per cent., was bituminous coal, while 3,119,265 tons, or 30 per cent. only was anthracite, and anthracite dust.

The coal mining industry of the Dominion has not made the strides it should have done. It has lagged behind the other mineral industries of Canada. In 1900 the total Canadian coal production was 5,777,319 tons. Last year, as previously mentioned, it reached 10,500,000, being an increase in nine years of four and three-quarter million tons. This figures out to an annual increase of half a million tons annually.

Compare this with the coal production of the United States. This has now reached the appalling total of five hundred million (500,000,000) tons per annum, and the output is increasing at the rate of fifty million (50,000,000) tons yearly. Compared with the coal mining industry of the United States, our Cana-

dian industry is very small beer indeed. But, small as it is, the coal mining industry yields one-fourth of the entire revenue that is obtained from the mineral output of the Dominion.

Will free coal tend to enlarge the growth of the coal mining industry? If under the fostering care of protective coal duties the industry has advanced by such insignificant increases in output, what will happen when the protection is removed and the barriers are let down?

It has become the fashion to believe that Canada is very poorly supplied with coal seams, and indeed it is rare to find anyone, outside of the limited circle of the men engaged in the coal industry, who has any true conception of what Canada possesses in the way of coal. It is quite true that from New Brunswick to Manitoba coal is not to be found, and that, as the recent Government Report puts it, "the coal fields of Canada are not found in proximity to the centres of population." Such a statement might be fairly modified if it read "not found in proximity to the present centres of population." Coal has a way of attracting population, and some day in Canada it will be far more correct to say that the coal fields "are in proximity to the large centres of population."

The report just referred to states that 60 per cent. of the Canadian output is produced in the Maritime Provinces, and 40 per cent. in the West. How long will it be before these figures are reversed? The report is accompanied by a map of the prairie provinces, Manitoba, Saskatchewan and Alberta, which the coal-bearing country is indicated by green coloring, and there is green enough to satisfy an Irishman on Patrick's morn. From the Peace River to Saskatoon, a distance of 600 miles, is one continuous stretch of coal-bearing land. quote from the Government's Report: "It is difficult to real-



the immense area underlaid by coal-bearing rocks in these provinces. Mr. Dowling, of the Geological Survey, has shown in a recently published map that there are four different coal horizons, all more or less productive, reaching from the summit of the Rockies to Manitoba between the international boundary and the Peace River."

New collieries are being opened up all the time in the Western coal field, and new coal companies in large numbers are seeking incorporation. Indeed, Western Canada seems on the eve of becoming one of the great coal-producing districts of the North American continent. In comparison to the vast coal deposits of Alberta and Saskatchewan the coal fields of the Maritime Provinces are small.

Free admission of American coal into Canada would spell ruin, absolute and irremediable ruin to Nova Scotia. How very dependable Nova Scotia is on her coal fields may be gathered from the fact that the idleness of one single colliery through fire was given as a partial excuse for a deficit in the provincial revenue in 1907. There is a coterie of mild lunatics in Nova Scotia who call themselves the "Free Coal League." At least one hears about this league occasionally, and therefore its existence is presumed, although some people say it is a one-man show. Letters from the league refer to the "incredible folly" of Canadians in refusing Uncle Sam's offer of reciprocity in coal. They claim that if the New England markets were open to Nova Scotian operators we should be shipping from this Province "16,000,000 per annum, instead of 600,000 as at present." The general argument of the reciprocity advocate is that New England is the natural market of Nova Scotia. Maybe, only New England is in the United States and Nova Scotia is in Canada. But aside from that, could Nova Scotian operators compete successfully with American operators even in New England? The United States coal trade papers say not, and they should know what they are talking about. "Mines and Minerals," in a very frank editorial, says in effect that free admission of U. S. coal into Canada would give to the American operators a large and profitable market, and at the same time the Nova Scotian coal operators could not successfully meet West Virginia coal in New England. If U. S. coal trade papers write in this strain, and if they see great advantage to themselves in a free coal arrangement, even for that particular territory which is claimed to be natural market of this province, how can that advantage be ours also? In vain is the net spread in the sight of any bird.

**U. M. W. A.**—On the application of two members of the U. M. W. of America, the Department of Labour has granted a Board of Conciliation to inquire into an alleged dispute between the Dominion Coal Company and its workmen. In their application the U. M. W. A. claim that the Coal Company has discriminated against members of the U. M. W. A., and has given preference to members of the Provincial Workmen's Association. That is about the gist of the complaint of the U. M. W. A., and they make the usual statutory declaration that unless the grievance is adjusted a strike will take place.

The Company have replied to the application in a very brief document. They say that no discrimination has taken place, but assert the right of the management to give preference of employment as the Company see fit. The reply says that recently, owing to dulness of trade, there has not been employment for all, and preference has been given in dispensing employment to members of the P. W. A., with which body the company have a contract for two years, and to which the majority of their workmen belong. The company state the prosperity of the Nova Scotian industry depends on its ability to meet American competition in Canadian market; that it would be most prejudicial to the industry of the workmen employed were under the control of a foreign union such as the U. M. W. A. having its headquarters in the United States. The reply concludes as follows: "It is a well-known fact that the coal

operators of the United States are making strenuous efforts to oust Nova Scotian coal from the St. Lawrence markets, and the Dominion Coal company is determined to protect its business and the vital interests of its employees by preventing this foreign labour union from exercising control over the majority of its workmen."

The Coal Company have refused to appoint a representative on the Board, and the Government have appointed Mr. Geo. S. Campbell, of Halifax, to act in this capacity. In granting the application, the Government appointed as the U. M. W. A. representative on the Board a person who is the local president of the U. M. W. A., and who is furthermore one of the persons against whom discrimination is alleged on the part of the Coal Company. The appointment is one that is open to justifiable criticism, and it can only be surmised that the department was misinformed when it made the appointment. If the appointment was made with a true knowledge of the facts, it makes a farce of the whole proceeding, and the precedent, if followed, will speedily negative the usefulness of the Industrial Disputes Act. It is understood, however, that the department acted under a misapprehension of the circumstances. The chairman, at the time of writing, was not appointed.

This Board of Conciliation will have an unusual task to perform, inasmuch as no dispute exists as the term is generally used. There is no question of wages or hours to be adjudicated upon, and there can be but little doubt that the framers of the Industrial Disputes Act had not foreseen the possibility of the Act being used as a means to force the recognition of a foreign trades union. Indeed, it is a little difficult to see how the terms of the Industrial Disputes Act can be said to cover the application of a foreign trades union, because the actions of such a union are beyond the purview and the jurisdiction of the Canadian law courts. The headquarters of the U. M. W. A. are in the United States, and all the members of the union must be governed by the orders which emanate from headquarters, or they cease to become members. Being outside the jurisdiction of the Canadian courts, the pains and penalties of the Act cannot apply to the officers of a foreign union, and it is difficult to see why the converse should not be true. The rulings of the Supreme Court of Canada would not be regarded in Indianapolis, but, under the constitution of the U. M. W. A. the rulings of Indianapolis must be obeyed in Canada. Herr Bebel, the leader of the Sozial-Demokratik party of Germany, might as fairly ask for the intervention of the Department of Labour as Tom Lewis, of Indianapolis. The cases are perfectly analogous.

## ONTARIO.

**Cobalt.**—In the March 15th correspondence it was stated that the Toledo Mines Co. had purchased a plant from the Sullivan Machinery Company. This was not the case, the plant in question being supplied by the Canadian Rand Co.

By far the most important find of the year in Cobalt was made by the Nipissing Mines Co. in their No. 64 shaft at a depth of 172 feet. The men were cutting out a station at this level when the vein was found, and the dip is such that it will come into the shaft a short distance below the stations. The vein matter is smallite, niccolite and native silver, with small amounts of bismuth. The vein varies in width from 13 to 30 inches, and will average about 22 inches. The ore is high-grade, and will assay several thousand ounces to the ton. While cutting out the station 13 tons of ore were taken out. No. 64 shaft is situated a few hundred feet east of the Temiskaming & Hudson Bay shaft, and the vein is supposed to be a continuation of one worked by the latter company. Several hundred feet of prospecting drifts on the 80-foot level failed to show any signs of the vein.



Great interest has been aroused by the new find made at the Cobalt Lake. On March 15th, when working in the west cross-cut from No. 6 shaft, at a depth of about 133 feet, a high-grade silver vein from 2 to 12 inches in width was discovered. A round of holes was fired on Saturday night, when coming off shift, but the ore was not discovered till Monday morning, when the men went in to do the mucking. The vein cuts the cross-cut at a slight angle, and is supposed to be a continuation of one of the McKinley-Darragh veins.

No. 8 vein of the Coniagas mine, which gave good results on the 75-foot level, has been struck again on the 150-foot level. The vein carries high values, and the wall rock is highly mineralized. The company's concentrator is treating about 80 tons of ore a day and produces one car of concentrates a month, assaying in the neighborhood of 2,000 oz. per ton. The shipments of the mine are very regular, and average one car of high-grade ore and one car of concentrates a month. The ore is treated by the smelter at Thorold, which is owned by the Coniagas people. A force of over one hundred men is employed at the mine.

Extensive development work is being carried on at the Trethewey mine, and the company also have a contract with the T. & H. B. mine, whereby the latter company is drifting in the 150-foot level on a continuation of one of their veins, in Trethewey ground. A small concentrating plant is in operation, and this month the company has shipped two cars of high-grade and one of low-grade ore to the smelters. A new jig and a concentrator table has been added to the ore-house. A force of 60 men is employed on the property.

Considerable development work is being done in No. 3 shaft of the Right of Way. At the 75-foot level the cross-cut running northeast has been driven over 200 feet, and the management expect to strike a good vein shortly. The vein has been traced on the surface, and was also worked by the Silver Queen, where it showed high values. A winze is being sunk from the present workings, and is now down 35 feet. It will be continued till a depth of 75 feet is reached. In No. 2 shaft, which is the main working of the mine, the new vein on the north side is being followed on the second level. This vein was found about a month ago, and has been drifted on for over 70 feet, and it carries high-grade ore. Very little stoping is being done on the property, most of the ore coming from development. A force of 90 men is employed:

Another strike has been made at the Chambers-Ferland, a 5-inch vein of cobalt having been discovered in the workings from No. 2 shaft.

The new 14-drill tandem compound air compressor for the Crown Reserve is now on the ground, and will be installed shortly.

The annual report of the Temiskaming mine has been issued, and shows a production for the year of 831 tons of ore, which produced 1,026,285 oz. of silver of a net value of \$494,211.46. A new plant with a greatly increased capacity has been installed, which will enable the company to carry on their mining operations on a much larger scale than heretofore. No. 1 shaft has been continued from the 200 to the 250 foot level, and the new No. 2 shaft with three compartments has been sunk to the 200-foot level.

A new strike has been made at the Columbus mine in the 250-foot level of the main shaft. Some time ago the mine was flooded by a subterranean body of water, but this has been pumped out and work resumed.

At the Kerry Mining Company's lease at Cart Lake a strike of importance was made on March 14th in the north cross-cut at the 100-foot level of their No. 1 shaft. The vein is calcite, carrying values in native silver. At the company's lease on

Peterson Lake, a station is being cut at the 125-foot level in preparation for drifting on a vein of calcite and native silver. The company intends to order new boilers and a compressor, as their present plant is inadequate to handle the work. A force of 40 men are at work on the property.

The Davis property, north of the Shamrock, has been leased to Mr. Bilsky, of the Nova Scotia, and his associates. They will obtain air from the Badger mine, the pipe for which is now being laid. Drills have been purchased, and work will be commenced as soon as air is ready for delivery at the mine.

A contract has been let to sink a 100-foot shaft on the property of the Eastbourne Cobalt Mining Co., located near the Badger mine. Several promising veins have been encountered in surface prospecting, and it is on one of these that the shaft will be sunk.

The Alexandria mine has struck good ore at the 170-foot level of the shaft. The vein was encountered at a depth of 160 feet, but at that time was only a very narrow stringer of calcite, but it subsequently widened and showed good silver values. The shaft will be sunk to the 200-foot level, when a cross-cut will be run to tap the No. 2 Bailey vein, lying about 60 feet south of the shaft. This vein shows up well on the surface. The present compressor is too small to do the work required, so a larger one will be installed.

The new compressor and gas producer plant recently installed at the Keeley mines will be ready to start in a short time. Silver has recently been struck in the No. 2 shaft.

The John Black Mining Co. is putting in a small boiler and hoist for development work.

The Bailey mine intends to put in a plant in a short time.

The Silver Cross Mining Co. has purchased a 60 h.p. boiler and a 3-drill compressor. The company intends to carry on the work on a larger scale than formerly.

Twelve men are employed at the Gifford mine sinking the shaft, which is now down to a depth of 75 feet. The shaft will be sunk to the 200-foot level before any drifting is done. Air for one drill is supplied from the Temiskaming mine, and the hoist is run by a small boiler.

Montreal and Buffalo capitalists have incorporated the Goodwin Lake Mines Co., the holdings of which consist of two hundred acres in the western edge of Lorraine Township. The company intends to push the development work as rapidly as possible.

The Quaker City Cobalt Mines, which have been closed down for the past year, have resumed operations. A 30 h.p. boiler, hoist, pump and two drills are now on the ground, and will be ready to commence operations about the last of March. A shaft 40 feet deep has been sunk on a calcite vein, and the company intends to continue sinking until a depth of 150 feet is reached. At that depth drifts will be run in the vein, and cross-cuts to tap parallel veins which show on the surface.

The Cobalt Rosario Mining Co., which owns two 20-acre claims in the vicinity of Iron Lake, Coleman Township, are sinking two shafts, one of which is down 35 feet, and the other 15 feet. They will be continued to the 100-foot level. The company has been doing surface prospecting since last summer and has shown up some calcite veins.

The Century mine in Bucke Township has bought a three-drill compressor and a 60 h.p. boiler. The machinery is now being installed, and it is expected that it will shortly be in operation.

Considerable work is being done by the Cobalt Mutual Mining Co. operating in Bucke. A contract has been let for one hundred feet of drifting from the lower level of the shaft on the claim located in Lot 1.



A force of ten men is doing development work on the property of the Haileybury Silver Mining Co. in South Lorraine. Drifts are being driven on the vein at the 72-foot level in No. 2 shaft. The vein is from four to five inches in width, but does not carry much silver at the present time.

W. H. Hayden, consulting engineer for the Elk Lake Cobalt Mines of Ontario, in the Elk Lake District, is putting in duplicate plants on two of the company's properties. Each plant will consist of a 60 h.p. locomotive boiler, a three-drill straight-line Rand compressor, a hoist and drills. Mr. Hayden is also putting in a similar plant for the Temagami Cobalt Mines of Ontario.

A force of 16 men is at work in the Devlin mine, Elk Lake, sinking two shafts, which will be continued to a depth of 100 feet. The company expects to be in a position to install machinery by next summer.

The Wettlaufer mine in South Lorraine has purchased two 60 h.p. locomotive boilers, a compressor and hoist.

The Montrose Syndicate Mines, operating in the same district, intend putting in a small plant for development work.

Mr. J. W. Ford, of Haileybury, has put in a small plant at his mine, located out near the Temiskaming.

Considerable activity is being displayed in the Larder Lake District, and machinery and supplies are being sent in over the road. The Reddick mine will install a gas producer, which will run the compressor. Fifteen men are working on the property, but a much larger force will be employed in the near future. The Victoria Creek Mining Co. are opening up properties with a force of fifteen men. A shaft, which will be sunk to a depth of 100 feet, is now down 40 feet.

Silvers, Limited, in Gowganda, have ordered a small plant. Work on the property will be pushed as rapidly as possible, and a carload of machinery and supplies has been shipped. A contract has been let for sinking a 100-foot shaft, and 100 feet of drifting from that level. The shaft is now down a short distance on the vein, which carries exceedingly high silver values.

Mr. C. A. Foster is putting in two 25 h.p. plants on his properties in Gowganda.

Twenty men are employed in mining operations at the Gowganda Queen mines, whose property consists of seven claims in the Gowganda District. Permanent camps have been erected, and excellent progress made with the development work.

The Cragg Mines, of Gowganda, have made an important strike. A vein three inches in width and carrying high silver values has been discovered and stripped for over fifty feet. A tunnel will be run to tap the vein at a depth of 100 feet.

The shaft on the Mann property is down over 25 feet, and will be sunk to the 100-foot level before a station is cut. Another shaft on the north lot will be sunk to the same depth. Two 25 h.p. plants are being installed, and a force of men are at work erecting additional camps.

A 10 x 6 vertical shaft is being sunk on the Boyd-Gordon property. Three veins are showing in the shaft which is now down to a depth of over 45 feet. These veins show very high values and considerable ore is already bagged ready for shipment. The ground, west of the shaft, is being cleared preparatory to starting an open cut, which will be worked while the shaft is being sunk to the 100 foot level. Over thirty men are at present employed on the property.

A shaft has been started on Captain Munn's property, south of the Bartlett Mines.

A good deal of the machinery for the Bartlett Mines is now on the ground, and the boilers are being brought in.

The Nipissing Central Railway Co. has asked for a franchise to build an electric road between Cobalt and Haileybury. The company guarantees that the road will be started by May 15 and finished November 1, 1909. A half hourly service would be maintained between the two towns. The line would be a great boon to the two towns, and particularly to those people who work in Cobalt, and who would live in Haileybury if possible, as the latter town is much preferable as a place of residence.

## BRITISH COLUMBIA.

**Roseland.**—The Le Roi 2, Ltd., which has just paid a regular quarterly dividend of two shillings per share, earned net profits of \$53,053 for the year 1907-8, exceeding the two previous fiscal years, when the figures were \$41,604 (1905-6) and \$12,555 (1906-7). The dividends paid during the three years mentioned amounted to \$37,800, against \$37,800 and \$12,600 respectively.

A good strike has been made on the ninth level of the War Eagle mine. The vein opened up at this point is forty feet wide and approximately 400 feet in length. Assays made so far show the ore carrying \$20 to \$100 in gold and copper. Large quantities of rich ore are being stoped from the eleventh and twelfth levels of the Centre Star mine, and from the four good ore shoots in the Iron Mask ground. The Trail smelter has entered into a long contract with the Le Roi 2, Ltd., for the treatment of its product, the arrangement during the past contract having proved profitable to both concerns. The Trail smelter is now treating 40,000 tons of ore per month, the gross value of the output per month being \$400,000 or \$4,800,000 per annum, approximately, of which about 40 per cent. is gold, silver 22 per cent., lead 22 per cent., and copper 16 per cent. Nearly all of the ore treated at this reduction works is derived from the mines of the Consolidated Co. itself.

The Le Roi mine was closed down for an indefinite period upon the return of A. J. McMillan, managing director, from London, last week. The working arrangements at the mine were somewhat unsatisfactory, as very little headway could be made in the affairs of the company as long as the shipments were so light. Mr. McMillan will return to England with Mr. W. A. Carlyle, consulting engineer, and if possible arrangements will be made to raise capital with which to explore the Le Roi ground as it should be explored. It is thought that the outcome of this move will be the organization of a company with sufficient capital to buy other mines, as well as do extensive development. In this way the Northport smelter could be run to its full capacity, and, with the installation of several modern appliances, on an economical basis.

Work has been suspended on the Giant-California group for an indefinite period.

**Boundary.**—Ore production at the Granby mines is up to the full capacity of the seven furnaces now working at the Grand Forks smelter; in fact, there is a surplus of ore in the bins at the smelter, which has necessitated the mines closing down an occasional Sunday. The production at the Mother Lode mine of the B. C. Copper Co. is going along steadily, but there was a cessation of operations at the Oro Denoro a few days last week.

At the Snowshoe mine the working force was reduced during the past seven days, as owing to a surplus of ore on hand at the Trail smelter shipments from this mine had to be curtailed.

In a report on the Dominion Copper Company's property, made in June last, F. A. Provot gives a few facts of interest concerning the costs for mining, smelting, etc. There is a probable ore reserve in the Rawhide and Idaho claims of this company of between two and three million tons of ore, which should average \$1 in gold, 18c silver and 22 lbs. copper, and which will very likely give a net recovery of 17 lbs. copper and \$1.15 in gold and silver to the ton. During the year ending July 31,



1907, the recovery was \$1.04 gold, silver 15c, copper 15.5 lbs. The copper recovery was rather low, owing to the large amount of Sunset ore, useful as a flux, put through the smelter to keep up the supply for the furnaces. Estimating what the Dominion Copper Co. could do, Mr. Provot says that treating a tonnage of 300,000 tons per annum they could mine and produce copper at the following figures: Cost of mining the ore per ton, \$1.25; smelting, \$1.38; converting, refining and marketing as per contract with the B. C. Copper Co., 3c per lb.; 17 lbs. would be 51c, making a total cost of \$3.14. Deducting \$1 for the value of the gold and silver would leave \$2.14 for the 17 lbs. copper per ton, or about 12c per lb. From this it will be seen that with copper at a normal figure, say 15c per lb., a profit of about \$120,000 per annum, could be realized. In all of the other mines of the Dominion Company than the Rawhide and Idaho extensive development work should be undertaken before the company would be warranted in making the necessary additions to the smelter. It would take \$50,000 to \$75,000 to place enough ore in the probable stoping areas of the different mines to warrant the resumption of operations and the installation of much-needed mining and smelting facilities.

A Boston company, F. W. Mason & Co., have sent a letter to the shareholders of the Dominion Copper Co., in which they voice the opinion that the right of the Reorganization Committee to sell the property of the company should be invalid after reorganization has been accomplished. This concern also thinks that the old shareholders should receive a bonus of 40 or 50 shares of the new stock when subscribing for the bonds instead of 10 shares. Their first contention seems sound, and the second is worthy of consideration. Reorganization is too often a game of "freeze-out" for the men who have put their good money into mining and industrial companies. The old shareholders should be able to get into the reorganized company on a good and fair basis, and it is only a matter of time until government supervision of corporations will control this feature of reorganization.

The Provincial Government has granted a charter to the Greenwood Tunnel-Tramway concern.

On the Bounty Fraction, near Beaverdell, high-grade galena ore is being taken from the new vein recently opened up, which is over three feet wide on an average.

**Slocan-E. Kootenay.**—The decision of the Supreme Court of the United States, removing the duty from zinc imported into that country, will very likely result in a large amount of zinc

ore being shipped to United States points pending the enlargement of the Nelson electric smelter.

The Consolidated Mining & Smelting Co. has taken a two and one-half years' lease on the Queen Victoria mine, near Nelson. Shipments and development work will be started as soon as things can be got in shape.

The greater part of the Silver King mine at Nelson has been unwatered, and the force is being augmented. Steady shipments will be made to Trail smelter as soon as the tramway can be put in good condition and stoping begun.

M. Davys has secured the Tiger group at a price of \$80,000, and will have arrangements completed to begin work on the property by the first of June. The group contains six claims.

It is understood, through advice received from London, that the Ymir Gold Mining Co. is putting out an issue of \$2,000,000 common stock. This will probably be used to raise capital with which to further develop the company's property.

What is known as the Echo group, comprising the Echo, Echo Fr., St. Elmo, Idaho, Portland and Ontario mining claims in the Sheep Creek district, have been bonded by Wm. Maher, of Nelson from the owners, who are Nelson, Rossland and Trail mining men. This property is situated on Summit Creek about four miles from the Mother Lode and Queen groups.

The Iona group of claims has been bonded by H. L. Rodger, of Spokane, for \$10,000. Work is to be commenced right away.

The International Coal & Coke Co. shipped 46,427 tons of coal during February, averaging over 2,000 tons for every working day. The net profit on the operations of the company last year was approximately \$275,000, after paying a dividend that absorbed about half of this amount the company shows a surplus of \$600,000 on the books.

**Vancouver.**—Operations are about to be resumed at the Ladysmith smelter. The plant will be operated to its full capacity this season.

Four claims have been staked by J. McCuish and Chas. Newman, on which there is a good showing of ore similar in character to that found in the Rossland district, although somewhat richer. Samples recently assayed show \$18 in gold, 25 oz. silver and something under 1 per cent. copper.

Jas. Cronin, erstwhile managing director of the St. Eugene, is deeply interested in a group of silver-lead mines in the Babine Mountain district. Work is to be started on this group as soon as the season opens.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

**North Sydney.**—Rev. M. A. McPherson, of Little Bras d'Or, who has had a gang of men prospecting for coal at Leitches Creek, a few miles from here, has found a seam of anthracite coal eight feet thick, with every indication of a large quantity.

### NEW BRUNSWICK.

**Campbellton.**—A company composed of Gloucester and Kent County men was formed last fall to explore lands in the St. Isidore district. Considerable preliminary work was done last fall, and this winter the government drill has been at work. At various depths seams of coal have been bored through, one being over two feet thick. Now at a depth of five hundred feet a seam four feet thick has been bored through. It is probable the deposit may be developed.

### ONTARIO.

**Cobalt.**—A vein 21 inches in width, of smaltite and native silver, was found in No. 64 shaft of the Nipissing at the 175 foot level. This is the first shipping ore located in this shaft, which is situated near the T. & H. B. line.

During February the Nipissing mined ore of an estimated value of \$144,384, and shipped ore of an estimated value of \$190,640. The important developments of the month included the striking of ore in a raise from the 210 foot level of vein No. 26; the cutting of veins Nos. 72 and 101 at depths of 75 feet; and the continued good showing at the Fourth of July shaft.

The structural steel for the new shaft at the Temiskaming is now being hauled in. There will be a large quantity of second grade ore available for the concentrator, which the Temiskaming is to erect before the summer is over.



The Muggley concentrator has finished milling several thousand tons for the Nova Scotia mine.

The main shaft of the Nova Scotia is down 235 feet in the same ore as found in the new vein last summer. No. 5 and No. 6 levels, which are now 75 feet apart, are being connected up. No. 5 is down 160 feet. There are now 130 men at work on the property.

A new vein has been struck on the Cobalt Lake property running parallel with the drift from No. 6 shaft. The vein runs along the McKinley-Darragh boundary, but is not the McKinley-Darragh vein, as the shaft will have to be continued about fifty feet farther to cut the McKinley vein. The new vein is one foot wide and carries high silver values.

The appeal of the Coniagas Mines, Ltd., and of the Coniagas Reduction Co., against the freight rates of the Grand Trunk on ore shipped from the mines to the smelter in Thorold, has been set by the railway commission for hearing in Toronto in May.

The February shipments comprised 17 mines, with 71 cars, containing 2,103.85 tons, or an average of 79 tons per mine. For February, 1908, the shipments were 1,184.53 tons, so that the 1909 shipments are nearly double those of 1908.

A vein four to six inches wide was caught in a circular cross-cut, 65 feet from the west cross-cut at the 80 foot level of No. 2 shaft on the Chambers-Ferland, at a point 275 feet from the shaft. The vein has been drifted on to the north of the cross-cut for twenty-five feet. At this point the drift is between the walls of an eighty foot ore body suitable for concentrating purposes.

A four inch vein of calcite was found at the 100 foot level on the Cart Lake lease of the Kerry Mining Co., about 120 feet distant from the shaft.

At the Coniagas, No. 8 vein, which was rich on the 75 foot level, was located on the 150 foot level, and, although narrow, shows very rich ore.

**Elk Lake.**—Elk Lake is at present in the midst of its first mayoralty campaign. There are in the field two well-known and highly respected citizens in the persons of Mr. Ludger Joudouin, general merchant, and Mr. John Munroe, pioneer locator and ex-pugilist. Either candidate should make a good mayor and will undoubtedly change the complexion of affairs around Elk Lake.

At the 60 foot level No. 1 vein on Elk Lake Discovery has widened to three inches of ore.

The mining recorder here has recorded over 300 claims in the Shining-tree district to date. According to reliable informants there have not been many bona-fide discoveries.

**Gowganda.**—It has been officially announced by the C. P. R. that a canoe freight route will be established to Gowganda from Bisco, on the C. P. R. main line, 35 miles west of Sudbury.

The Government has made public the tenders received for Gowganda townsite lots. Over 500 tenders were received. One hundred and twenty lots were undisposed of. 130 lots are to be sold for \$17,664.50, or an average price of \$136. The highest bid was \$412, and the lowest accepted was \$25. The successful tenderers include parties in Toronto, Ottawa, Montreal, and New York.

In anticipation of a building boom enormous supplies will be rushed to the town as soon as the Government makes public its transportation policy.

#### BRITISH COLUMBIA.

**Rossland.**—A strike of considerable importance has been made in the War Eagle, in the ninth level. Drifting has shown the new vein to be 40 feet wide and 400 feet long, containing

heavy sulphides, with high gold values. This same vein has been productive on the tenth level, and while no work has been done on it in the upper levels it is thought the ore will extend several hundred feet above the ninth level and possibly to the surface.

Rich ore has been found on the eleventh and twelfth levels of the Centre Star in some of the larger stopes. During February the Centre Star made profits of \$30,000.

Recent developments on the Idaho have been most profitable. On the fourth level a stope 150 feet long by from 20 to 30 feet wide is producing a good tonnage of heavy sulphide ore, containing about ten dollars in gold, besides good values in copper and silver. On the main vein stoping is being continued westward, recent values in the west drift having been high.

Three furnaces are running at the consolidated company's smelter at Trail, treating about 1,000 tons of copper ore per day, from which are being produced six hundred tons of copper matte per month, containing \$240,000 worth of gold. The lead furnace averages 200 tons of ore per day. The lead refinery at Trail is producing 2,000 tons of pig lead per month, and is shipping close to 250,000 ounces of refined silver to China each month.

Pending arrangements for the exploration of the property down to 2,500 or 3,000 feet from the surface, the Le Roi mine has laid off a number of men. The exploration work carried on for some months past has proved disappointing, and it has been decided to suspend operations until arrangements are made for carrying out a large and comprehensive plan of exploration and development.

**Phoenix.**—Seven furnaces are at present in operation at the Granby, the enlargement of the second battery not being completed as yet. The mines have been more than supplying the requirements of the smelter in ore, all the bunkers being filled at present and some 75 loaded cars on a siding.

**Greenwood.**—One of the biggest mining deals in British Columbia for some months past was closed recently, when the Granby Smelter Company purchased large copper claims on Moresby Island, near Queen Charlotte Island, for \$100,000. It is likely another smelter will be erected similar to their present works here.

**Ymir.**—The Ymir Mining Company has decided to spend \$100,000 in prospecting both the old and new Ymir leads. Several diamond drills are now at work and the force will be increased.

On the old vein it is the intention to push the drills some 500 or 600 feet below the present 1,000 foot level.

**Trail.**—During January the Trail smelter treated 6,452,624 lbs. of lead ore, which produced 2,979,631 lbs. of lead. The principal shippers were the St. Eugene with 2,752,952 lbs. ore producing 1,650,715 lbs lead; the Reco with 595,639 lbs. ore producing 237,292 lbs. lead; and the Blue Bell with 552,821 lbs. ore producing 351,885 lbs. lead.

**Hosmer.**—The tunnel on the Hosmer Coal Mines Company's property has now reached a depth of 4,150 feet from the entrance. To reach the limit of their grounds the company will have to drive their tunnel 7,980 feet, but it is thought all workable seams in the series will have been cut before that. There are 14 to 16 seams of coal and the tunnel is now approaching No. 9, so there are five seams still to be cut.

Ten more coke ovens are being built, making a total of 80 ovens in commission.

**Nelson.**—William Maher has bonded the Echo group at Sheep Creek to a party of Nelson, Rossland and Trail operators.

The decision of the United States Supreme Court that the duty on zinc ores imported into the United States is illegal

will likely make things hum in the Slocan. The court has ruled that duties paid on zinc ores must be refunded. The Whitewater, Ruth, Lucky Jim and other properties have been large shippers of zinc to the United States, and this decision means much to them. It is expected that the Lucky Jim, Blue Bell, Bosun, and Jackson will resume active operations in the immediate future.

A strike has been made in the Summit mine of a pay streak three feet wide, showing gold values of \$470 per ton. The Summit has been a small shipper for two years, but a good deal of development has been done.

**Kaslo.**—The Wagner mine has been bonded for a large sum to D. C. Corbin, in conjunction with the C. P. R.

The Maestro, at Ainsworth, is being steadily operated by H. Gregerich and Grant King. Some ore is being taken out and regular shipments are being maintained.

The old Payne mine at Sandon is to be thoroughly gone over and tested with diamond drills. A group of Montreal men are behind the project, and if the drilling shows satisfactory results

it will probably cause a revival of mining activity around Sandon.

Owing to the demoralized condition of the K. and S. railroad the February shipments were very small, but the output for March will probably be heavy.

The Flint mine is again on the shipping list.

**Nanaimo.**—The Nanaimo-Vancouver Coal Company has met with very encouraging results in the development of its property. Two large seams have been struck, the upper one four feet thick, and the lower one seven and a half feet. The company has also twelve feet of fire clay on the property. The property is at present under bond to eastern parties.

Some 4,000 acres of coal lands in the Cedar, Cranberry and Oyster districts, adjacent to Nanaimo, have been purchased by a big syndicate.

**Vancouver.**—The Ingenika-Findlay River Development Co. has acquired the copper claims held by the Moresby Island Developing Co., and a gang of men has been sent north to develop the properties.

## MINING NEWS OF THE WORLD.

### GREAT BRITAIN.

The export duty on diamonds from Damaraland will be altered to one-third ad valorem on sale prices, and not 1s 3d, as reported.

In order to encourage research work with radium a new institute is being formed to be called the Royal British Radium Institute. The council contains distinguished names, such as Sir William Ramsay, Sir Frederick Treves, and Prof. J. J. Thompson.

The principal source of radium is the mineral pitchblende, which is found principally in Bohemia and Cornwall.

The coal owners of Notts and Derbyshire are combining for the purpose of building a rescue station, which is to be erected close to the Sherwood Colliery, Mansfield. The Duke of Portland has given a site and the estimated cost of the building is £1,500.

### GERMANY.

An international syndicate in which Germany, France, and Great Britain are principally interested, has been formed for the exploration of the iron ore deposits in Morocco.

### CHINA.

A concession has been granted by the Chinese Government to work mines in Hainan, near Hong Kong. It has been known for some time that there are large deposits of gold, tin, coal and iron in Hainan, and it is said that the concession is a valuable one.

### AUSTRALASIA.

Owing to labour troubles and the unsatisfactory condition of the market the famous Broken Hill Mine, one of the largest producers of lead in the world, shut down for an indefinite time on March 15th.

The employees of the State of Western Australia are vigorously opposing proposed amendments to the Workers' Compen-

sation Act. The employers claim that it is really class legislation, and that the Government should not interfere with private enterprise. The proposed amendments, among other things, will make employers liable for accidents caused by wilful misconduct, and classes certain diseases peculiar to worker's callings, such as miners' complaint, etc., as accidents.

A new smelting process to treat refractory ores, to extract gold and silver from ore, containing besides the precious metals, also arsenic, zinc, galena, antimony, and traces of copper, has been put in operation at the Moruya Gold and Silver Syndicate's mine. The process is known as the Oxy-Hydro smelting process.

The dredging industry in New Zealand has been steadily decreasing. During 1908 several companies went into liquidation, and others did not pay expenses. The total gold yield has been on the down grade for several years.

### BELGIUM.

A plant for the electrical production of steel has just been put down at the works of the Cockerill Company at Seraing, Belgium.

### SOUTH AFRICA.

The difficulties caused recently by the flooding of the Witwatersrand mines are pretty well over. The flooding increased the amount of water dealt with by the Knights Deep mine from 1,000,000 gallons to 1,700,000 gallons in 24 hours. At the Knights mine 24 natives were imprisoned by the floods, but were rescued with great difficulty.

The number of Chinese labourers in the Rand mines decreased last year by 21,574.

A shipment of 6,000 tons of Transvaal coal has been sent to India. This is the first shipment of Transvaal coal ever sent there.

Rhodesia is a country of small mines. Analysis of a recent return shows that 33 per cent. of the gold output came from mills of five stamps or less; 52 per cent. from mines having



from 5 to 10 stamps, and only 15 per cent. from mines having more than 10 stamps each.

### UNITED STATES.

The Fink smelting plant at Garfield, Utah, has been started again and experiments are to be carried on for some time.

The Engineering and Mining Journal estimates the production of platinum in the United States during 1908 as 510 oz. The production during 1907 was 357 ounces.

The Pennsylvania Steel Company has announced a reduction in wages of approximately ten per cent. to take place April 1st.

Owing to recent heavy rains in California a large number of placer and quartz properties have been compelled to suspend

operations, but as soon as the surplus water has drained off work will be resumed.

### MEXICO.

The production of the Cananea Con. Copper Co. is averaging a trifle over 67 tons per day, and the output for February was 3,752,000 lbs., the highest since the resumption of operations. Various improvements are under way, but no effort will be made to push the yield beyond the 4,000,000 lb. mark until the demand for copper is firmer.

The International Oil and Gas Co. of Indianapolis, Ind., is soon to begin drilling for oil in the eastern part of Chihuahua. The company has oil rights over nearly 10,000,000 acres.

Legal difficulties with the people who furnish the wood used as fuel at a number of the mines in Taviche, Oaxaca, are making it difficult to obtain necessary fuel before the rainy season sets in.

## COMPANY NOTES.

### DOMINION COAL PAYS 1 PER CENT.

Directors of the Dominion Coal Company have declared the regularly quarterly dividend of 1 per cent. payable April 1st, to shareholders of record March 19th.

When the Privy Council judgment was announced there was a feeling that the Coal dividend might be postponed. The announcement now comes, therefore, as a surprise to many.

### ANOTHER BUFFALO DIVIDEND.

The Buffalo Mines Company has declared the regular quarterly dividend of 5 per cent., payable April 1st, and an extra dividend of 3 per cent., payable May 15th.

The previous dividend was of 5 per cent., and an extra of 1 per cent. each month for the quarter, payable January 2nd.

### COBALT CENTRAL CUTS DIVIDEND.

Cobalt Central has declared a quarterly dividend of 1 per cent., a reduction of 1 per cent., as compared with the preceding quarter. The dividend is payable May 15th, to stock of record of April 15th.

### CROWN RESERVE DIVIDEND.

The directors of the Crown Reserve Mining Co. have declared the regular quarterly dividend of 6 per cent., with a bonus of 9 per cent., making a total disbursement of 15 per cent. for the quarter ending March 31st, 1909. This is almost double the last payment, which was 16 per cent. for the six months ending December 31st, 1908.

It is said that after the quarterly disbursement there will be a surplus of \$50,000, which will be carried to the reserve fund, bringing that fund up to the total of \$397,000.

### TEMISKAMING MINING CO.

The annual meeting of the Temiskaming Mining Co., Ltd., was held in Toronto on February 20th.

The mine's production during its fiscal year amounted to 831,000 tons, which produced 1,026,285 ounces of silver, of a net value of \$494,211.46. The cost of production during the year has averaged 82.5 cents per ounce.

The quarterly production shows that it has been increasing gradually, as shown below:—

|                           | Ounces.      | Value.       |
|---------------------------|--------------|--------------|
| February to April.....    | 103,690.19   | \$45,193.15  |
| May to July .....         | 220,401.28   | 108,341.57   |
| August to October .....   | 314,287.82   | 150,288.63   |
| November to January ..... | 387,906.60   | 190,388.11   |
| Totals . . . . .          | 1,026,285.89 | \$494,211.46 |

At the present time there are 16,000 tons of ore on the Temiskaming dumps, having an estimated value of one-quarter million dollars. This ore is to be concentrated during the present year at an expenditure of probably \$100,000.

On January 31st the company had as cash in hand and cash value of ore in transit \$122,761.07. The next dividend will be paid on April 1st.

The small plant that has been used is now being kept as an auxiliary plant, and the new plant, with its greatly increased capacity, will enable the management not only to do much more extensive mining, but to develop the mine and block out ore.

No. 1 shaft has been continued to the 250 foot level, and the new No. 2 shaft is down below the 200 foot level, and is to be continued farther.

From shaft No. 1 there have been 1,648 feet of drifting, 519 feet of cross-cutting, 587 feet of sinking and raising.

At the 200 foot level 258 feet of drifting has been done and 469 feet of similar work at the 250 foot level.

The officers for the current year are: Burr E. Cartwright, President; R. T. Shillington, M.L.A., Vice-President; Alex. Fasken, Secretary-Treasurer; Richard A. Cartwright, of Brockport, Pa., and Joseph L. Wheeler, of Marion, S.C., are the other directors, and Norman R. Fisher, M.E., is the general manager and engineer in charge.

### CROW'S NEST PASS ANNUAL MEETING.

Several changes were made in the directorate of the Crow's Nest Pass Coal Co. at the annual meeting held recently in Toronto.

At the meeting President G. G. S. Lindsay, Vice-President Senator Jaffray, Third Managing Director Sir Henry M. Pellatt and Mr. E. R. Wood, all residents of Toronto, declined further to serve on the Board, though urged to do so.

The directors chosen were: Elias Rogers, Toronto; Col. Clough, New York; J. P. Graves, Spokane; W. F. Robertson, Granby, Que.; E. C. Whitney and H. B. McGiverin, M.P., Ottawa, and R. N. Young, Secretary of the company.

#### CITY OF COBALT DIVIDEND.

A 3 per cent. quarterly dividend, payable April 15th, has been declared by the directors of the City of Cobalt Mining Co. The dividend is 3 per cent. on the new capitalization of \$1,500,000, and is therefore equal to 9 per cent. on the old capitalization of \$500,000.

#### LE ROI NO. 2 COMPANY.

The eighth annual meeting of the Le Roi No. 2 Company was held in London, England, on February 26th.

The accounts show a balance in favor of profit and loss of £53,053 2s 6d, after writing off £19,795 2s 10d as depreciation on development, machinery, plant, buildings, etc. Out of this dividends of 6s per share, absorbing £37,800 have been paid, and the directors recommend that £10,000 be placed in the general reserve account.

The tonnage shipped amounted to 29,648 tons of an average value of \$23.60 per ton. Diamond drilling has confirmed the existence at a depth of about 1,200 feet, of what is undoubtedly the continuation of the south vein of the Le Roi mine.

In order to open up this ore body, it has been decided to continue the sinking of the main shaft from the 900 foot level. This will be greatly facilitated by the fact that the company have leased the Nickel Plate compressor, which will furnish the requisite amount of air.

The reports of the consulting engineers, Messrs. Hill and Stewart is substantially as follows: The total footage accomplished is 4,572.1 feet.

The greater portion of the development work has been done on the 300 foot level. Connection has been made with the California workings during the year, a distance of 309 feet, having been driven from the Josie 500 foot level for this purpose. This connection has improved the ventilation of both mines.

The work on the 700 foot level of the Josie has been directed towards opening up the Hamilton vein. The work has located the downward continuation of the East Hamilton shoot. This ore body is now being opened up from the 703 stope, but to make the work continuous a raise will have to be put up to connect with the 500 foot level on account of the ventilation.

The development during the year has been 3,902.1 feet of drifts, 400.5 feet of cross-cuts and 269.5 feet of raises and winzes, or a total of 4,572.1 feet, as compared with 2,793.1 feet last year. The development work has cost \$58,603.17 for driving and cross-cutting, and \$6,196.55 for raising, or \$14,172 per foot, as compared with \$14,576 last year.

During the year 3,606.5 feet were drilled in the Josie, and 3,833 feet in No. 1 mine, by the diamond drill. The work cost in labor and material \$2.39 per foot, as against \$2.61 per foot last year.

The most important discovery during the year with the diamond drill was the downward continuation of the south Le Roi vein, located at a depth of 1,200 feet close to the boundary of the Annie claim of the Le Roi Mining Co.

During the year five new stopes have been opened up on the Hamilton vein, and preparations are now being made to open up another in the east tramway tunnel. Three of these stopes are situated on the 300 foot level and two on the 700 foot level.

During the year 15,044.5 tons have been crushed, averaging .107 ounces gold, .137 ounces silver and 4.6 per cent. copper.

The tails from the above have been worth .032 ounces gold and .42 per cent. copper. The cost of milling this year has been \$1.14 per ton, as compared with \$1.37 last year, when 11,840 tons were milled.

The total amount of ore and waste raised from the mine was: Mixed ore, 40,034 tons, second-class and mill ore, 5,453 tons; actual waste, 12,215 tons. After hand-picking the output resolved into: Shipping ore, 29,648 tons; concentrating ore milled, 13,139 tons; concentrating ore placed on dump, 2,700; total of shipping ore and concentrating ore milled and placed on dump, 45,487 tons; waste, 12,215 tons.

The stoping costs amounted to \$175,765.68. The cost per dry ton of ore mined was \$3.60. There has been written off for depreciation \$83,145.61, averaging \$1.71 per ton. This makes the total cost of mining \$5.31 per ton. The gross value of the ore was \$699,740.77 or \$23.601 per ton. The values in the ore were: gold, \$19,194; silver, .379; copper, \$4.028.

The receipts from the smelter amounted to \$535,245.55, or \$18.053 per ton. The total smelting charges on the above, direct and indirect, have been \$5.548 per ton.

During the current year efforts will be chiefly devoted to the development of the property at depth, in order to open up and extract the ore now proved by the drill to enter the company's ground at a depth of 1,200 feet. The retimbering of the main shaft must also be undertaken in order to preserve it in the effective state necessary in view of the prolonged life of the mine which the successful development at great depth must naturally entail.

#### NICOLA VALLEY COAL AND COKE CO. REPORT.

The annual report of the Nicola Valley Coal and Coke Co. shows that the mines are being developed on a large scale, and that the market is growing rapidly.

The improvements to equipment at the mine above ground are as follows: Tipple house, trestle and chute at No. 4 mine; four cottages, powder magazine, fire hall and blacksmith shop, etc; extensions to waterworks system, and various works of minor importance.

The company have five workable seams, having a total thickness of 49 feet. Four of these seams are at present being worked. The Jewel seam (18 feet 6 inches thick) has been developed the most. The main tunnel has been driven nearly 1,300 feet, and is well timbered and laid with track for the whole length.

The following are the directors for the present year: John Hendry, President; Alex. McLaren, Vice-President; W. H. Armstrong, Managing Director and General Manager; J. J. Plommer, Secretary-Treasurer; R. P. McLennan, F. R. Stewart, Geo. E. Trorey, H. B. Wright, L. N. Mackechnie, M.D., Directors.

#### LA ROSE CONSOLIDATED MINES COMPANY.

Notice is hereby given that a dividend of 3 per cent. for the quarter ending 28th February, 1909, and a bonus of 1 per cent. has been declared upon the outstanding capital stock of the company, and will be paid on the 20th day of April, 1909, to shareholders of record at the close of business on 1st April, 1909.

By order of the Directors, the transfer books will be closed from the close of business on 1st April, 1909, and remain closed until 10 a.m. on 27th April, 1909.

Dated the 22nd day of March, 1909.

#### LA ROSE CONSOLIDATED MINES COMPANY.

Per D. A. DUNLAP,

Secretary-Treasurer.



# STATISTICS AND RETURNS.

## COBALT ORE SHIPMENTS.

Following are the weekly shipments from the Cobalt camp, and those from January 1 1909, to date:—

|                            | Week ending<br>Mar. 6. | Since<br>Jan. 1. |
|----------------------------|------------------------|------------------|
|                            | Ore in lbs.            | Ore in lbs.      |
| Buffalo . . . . .          | 45,210                 | 178,220          |
| Coniagas . . . . .         | 62,500                 | 334,405          |
| Crown Reserve . . . . .    | 62,220                 | 967,920          |
| Chambers-Ferland . . . . . | 60,000                 | 202,000          |
| City of Cobalt . . . . .   | 75,000                 | 465,930          |
| La Rose . . . . .          | 195,000                | 2,462,340        |
| Nipissing . . . . .        | 384,410                | 2,161,688        |
| Peterson Lake . . . . .    | 51,400                 | 132,960          |
| Trethewey . . . . .        | 60,000                 | 402,930          |
| T. & H. B. . . . .         | 60,000                 | 444,060          |

Ore shipments to March 6, 1909, are 9,903,287 pounds, or 4,951 tons. The total shipments for week ending March 6 were 1,055,740 pounds, or 527 tons.

|                            | Week ending<br>Mar. 13. | Since<br>Jan. 1. |
|----------------------------|-------------------------|------------------|
|                            | Ore in lbs.             | Ore in lbs.      |
| Buffalo . . . . .          |                         | 178,220          |
| Coniagas . . . . .         | 61,000                  | 395,405          |
| Crown Reserve . . . . .    | 100,000                 | 1,067,920        |
| Cobalt Central . . . . .   |                         | 121,755          |
| Chambers-Ferland . . . . . |                         | 202,000          |
| City of Cobalt . . . . .   | 60,000                  | 525,930          |
| Kerr Lake . . . . .        | 60,045                  | 265,142          |
| King Edward . . . . .      |                         | 53,920           |
| La Rose . . . . .          | 207,800                 | 2,670,140        |
| McKinley-Darragh . . . . . | 56,800                  | 364,880          |
| Nipissing . . . . .        | 260,961                 | 2,422,649        |
| Nova Scotia . . . . .      |                         | 401,390          |
| Nancy Helen . . . . .      |                         | 40,000           |
| Peterson Lake . . . . .    |                         | 132,960          |
| O'Brien . . . . .          | 64,100                  | 191,980          |
| Right of Way . . . . .     |                         | 495,085          |
| Silver Queen . . . . .     |                         | 65,000           |
| Temiskaming . . . . .      |                         | 370,000          |
| Trethewey . . . . .        | 65,000                  | 467,930          |
| T. & H. B. . . . .         | 60,000                  | 504,060          |
| Muggley Con. . . . .       |                         | 72,900           |

Ore shipments to March 6, 1909, are 10,958,993 pounds, or 5,479 tons. The total shipments for week ending March 6 were 1,055,706 pounds, or 527 tons.

## CROW'S NEST PASS OUTPUT.

The output of the collieries of the Crow's Nest Pass Company for the week ending March 12th was 16,423 tons, a daily average of 2,737 tons.

The output for the week ending March 19th was 17,936 tons, a daily average of 2,989 tons.

## BRITISH COLUMBIA ORE SHIPMENTS.

The following are the ore shipments for the week ending March 5th and year to date:—

### Boundary Shipments.

|                       |        |         |
|-----------------------|--------|---------|
| Granby . . . . .      | 21,016 | 175,809 |
| Mother Lode . . . . . | 7,728  | 80,136  |
| Snowshoe . . . . .    | 4,142  | 32,838  |
| Other mines . . . . . | .....  | 2,094   |
| Total . . . . .       | 32,886 | 290,877 |

### Rossland Shipments.

|                                |       |        |
|--------------------------------|-------|--------|
| Le Roi . . . . .               | 2,479 | 7,849  |
| Centre Star . . . . .          | 3,485 | 21,953 |
| Le Roi No. 2 . . . . .         | 1,045 | 5,651  |
| Le Roi No. 2, milled . . . . . | 260   | 2,080  |
| Other mines . . . . .          | ..... | 5,462  |
| Total . . . . .                | 7,269 | 42,995 |

### Slocan-Kootenay Shipments.

|                 |       |        |
|-----------------|-------|--------|
| Total . . . . . | 2,990 | 30,149 |
|-----------------|-------|--------|

The total shipments for the past week were 43,145 tons, and for the year to date 264,021 tons.

### Consolidated Co.'s Receipts.

#### Trail, B.C.

|                           |       |        |
|---------------------------|-------|--------|
| Richmond Eureka . . . . . | 164   | 780    |
| Centre Star . . . . .     | 3,485 | 21,853 |
| Snowshoe . . . . .        | 2,292 | 18,821 |
| Reco . . . . .            | 63    | 578    |
| St. Eugene . . . . .      | 174   | 2,919  |
| Le Roi No. 2 . . . . .    | 1,045 | 5,674  |
| Emerald . . . . .         | 37    | 422    |
| Standard . . . . .        | 61    | 772    |
| First Thought . . . . .   | 31    | 164    |
| Other mines . . . . .     | ..... | 2,208  |
| Total . . . . .           | 7,397 | 54,371 |

### Granby Smelter Receipts.

#### Grand Forks, B.C.

|                       |        |         |
|-----------------------|--------|---------|
| Granby . . . . .      | 21,016 | 154,472 |
| Other mines . . . . . | .....  | 85,580  |
| Total . . . . .       | 21,016 | 240,052 |

**B. C. Copper Co.'s Receipts.****Greenwood, B.C.**

|                   |       |        |
|-------------------|-------|--------|
| Mother Lode ..... | 7,728 | 72,829 |
| Snowshoe .....    | 1,850 | 9,820  |
| Other mines ..... | ..... | 1,843  |

|             |       |        |
|-------------|-------|--------|
| Total ..... | 9,578 | 84,492 |
|-------------|-------|--------|

**Le Roi Smelter Receipts.****Northport, Wash.**

|                   |       |       |
|-------------------|-------|-------|
| Le Roi .....      | 2,479 | 7,849 |
| Other mines ..... | 814   | 2,594 |

|             |       |        |
|-------------|-------|--------|
| Total ..... | 3,293 | 10,443 |
|-------------|-------|--------|

The total smelter receipts for the past week were 41,084 tons, and for the year to date 399,358 tons.

The following are the ore shipments for the week ending March 13th and year to date:—

**Boundary Shipments.**

|                   |        |         |
|-------------------|--------|---------|
| Granby .....      | 15,488 | 190,262 |
| Mother Lode ..... | 8,786  | 79,870  |
| Snowshoe .....    | 1,681  | 20,502  |
| Other mines ..... | .....  | 1,543   |

|             |        |         |
|-------------|--------|---------|
| Total ..... | 25,955 | 293,177 |
|-------------|--------|---------|

**Rossland Shipments.**

|                            |       |        |
|----------------------------|-------|--------|
| Centre Star .....          | 4,412 | 26,265 |
| Le Roi No. 2, milled ..... | 260   | 2,440  |
| Le Roi No. 2 .....         | 453   | 6,124  |
| Le Roi .....               | 611   | 8,460  |
| Other mines .....          | ..... | 92     |

|             |       |        |
|-------------|-------|--------|
| Total ..... | 5,736 | 43,381 |
|-------------|-------|--------|

**Slocan-Kootenay Shipments.**

|             |       |        |
|-------------|-------|--------|
| Total ..... | 3,639 | 33,687 |
|-------------|-------|--------|

The total shipments for the past week were 35,430 tons, and for the year to date 370,236 tons.

**Granby Smelter Receipts.****Grand Forks, B.C.**

|             |        |         |
|-------------|--------|---------|
| Total ..... | 15,488 | 191,262 |
|-------------|--------|---------|

**B. C. Copper Co.'s Receipts.****Greenwood, B.C.**

|                   |       |        |
|-------------------|-------|--------|
| Mother Lode ..... | 8,786 | 79,870 |
| Other mines ..... | ..... | 1,483  |

|             |       |        |
|-------------|-------|--------|
| Total ..... | 8,786 | 81,353 |
|-------------|-------|--------|

**Consolidated Co.'s Receipts.****Trail, B.C.**

|             |       |        |
|-------------|-------|--------|
| Total ..... | 7,674 | 62,068 |
|-------------|-------|--------|

**Le Roi Smelter Receipts.****Northport, Wash.**

|                   |     |       |
|-------------------|-----|-------|
| Le Roi .....      | 611 | 8,460 |
| Other mines ..... | 299 | 3,222 |

|             |     |        |
|-------------|-----|--------|
| Total ..... | 910 | 11,682 |
|-------------|-----|--------|

The total smelter receipts for the past week were 32,858 tons, and for the year to date 346,365 tons.

**MARKET REPORTS.****Silver Prices.**

|              |     | New York<br>Cents. | London.<br>Pence. |
|--------------|-----|--------------------|-------------------|
| March 8..... | 50¼ | 23½                |                   |
| " 9.....     | 50½ | 23 5-16            |                   |
| " 10.....    | 50¾ | 23 3-16            |                   |
| " 11.....    | 50¾ | 23 3-16            |                   |
| " 12.....    | 50½ | 23¼                |                   |
| " 13.....    | 50¾ | 23 5-16            |                   |
| " 15.....    | 50¾ | 23 5-16            |                   |
| " 16.....    | 50¾ | 23¾                |                   |
| " 17.....    | 50½ | 23¼                |                   |
| " 18.....    | 50½ | 23¼                |                   |
| " 19.....    | 50½ | 23¼                |                   |
| " 20.....    | 50¾ | 23 5-16            |                   |

March 19.—Connellsville coke, f.o.b. ovens:—  
Furnace coke, prompt, \$1.50 to \$1.60.  
Foundry coke, prompt, \$2. to \$2.15.

**Metals.**

March 19.—Tin, Straits, 28.50 cents.

Copper, prime Lake, 12.75 cents.

Lake, arsenical brands, —

Electrolytic copper, 12.25 to 12.35 cents.

Copper wire, 14.25 cents.

Lead, 4.05 cents.

Spelter, 4.85 cents.

Sheet zinc, 7.25 cents.

Antimony, Cookson's, 7.90 cents.

Aluminium, 22 to 24 cents.

Nickel, 40 to 47 cents.

Platinum, \$22.50 to \$23.50 per ounce.

Bismuth, \$1.75 per lb.

Quicksilver, \$45 to \$46 per 75 lb. flask.





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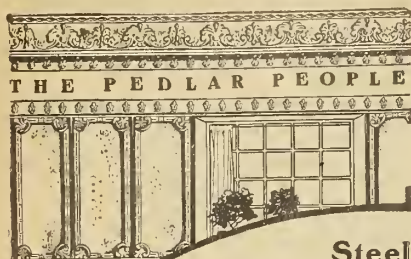
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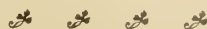
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|                                                                                                                                                                  |                                                                                                                                                 |                                                                                                                                                          |                                                                                                                                |
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| <b>DeMOREST, STULL &amp; LOW</b><br>Civil and Mining Engineers.<br><br>Ontario Land Surveyors, Etc.<br>Sudbury, Ont.                                                                                                                                              | <b>GILLESPIE, GEORGE H.</b><br>Consulting Mining Engineer<br>MADOC, ONTARIO                                                             | <b>HILLE, F.</b><br>Mining Engineer.<br>Mines and Mineral Lands Examined and Reported On.<br>Port Arthur, Ontario, Canada.                                                                                                                                                                                                       |
| Branch Office: Sturgeon Falls, Ont.                                                                                                                                                                                                                               | <b>GWILLIM, J. C.</b><br>Consulting Mining Engineer<br>Kingston, Ont.                                                                   | <b>HAGGEN, EDWARD A.</b><br>Mining Engineer<br>Revelstoke, British Columbia<br>Mine Management<br>Examinations and Reports                                                                                                                                                                                                       |

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## BRITISH COLUMBIA

## The Mineral Province of Canada

has produced to the end of 1906, \$68,721,103 of Placer Gold; \$41,015,697 of Lode Gold, \$25,586,008 of Silver \$17,625,739 of Lead; \$35,546,578 of Copper; \$79,334,798 of Coal and Coke; and \$5,813,799 of Other Mineral or a total of **\$273,643,722**. The Mineral Production of the Province for 1906 was

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The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was \$5,579,037 the Lead Output 52,408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

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Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

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## OFFICES

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**Fernie, British Columbia**

Gold Medal—Coal and Coke—Lewis & Clark Exposition, 1905.  
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Coke Ovens and Coke Ovens at Fernie, Coal Creek, Michel and Bonado.

Annual Capacity of Mines, 2,000,000 tons. Coke Ovens, 50,000 tons.

We are shipping domestic coal to points in Manitoba, Alberta, Saskatchewan, British Columbia, Montana, Washington and Idaho, a territory of over 400,000 square miles, **WE ARE GIVING SATISFACTION.**

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# DOMINION



# OF CANADA

## Synopsis of Canadian North-West Mining Regulations

**COAL**—Coal mining rights may be leased for a period of 21 years at an annual rental of \$1 per acre. Not more than 2,560 acres shall be leased to one individual or company. A royalty at the rate of five cents per ton shall be collected on the merchantable coal mined.

**QUARTZ**—A person 18 years of age, or over, having discovered mineral in place may locate a claim 1,500 x 1,500 feet.

The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year, or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey made, and upon complying with other requirements, purchase the land at \$1 per acre.

The patent provides for the payment of a royalty of 2½ per cent. on the sales.

Placer mining claims generally are 100 feet square; entry fee \$5, renewable yearly.

An applicant may obtain two leases to dredge for gold of five miles each for a term of twenty years, renewable at the discretion of the Minister of the Interior.

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles. Rental \$10 per annum for each mile of river leased. Royalty at the rate of 2½ per cent. collected on the output after it exceeds \$10,000.

**W. W. CORY, Deputy of the Minister of the Interior**

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SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch if requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advert kindly mention this Journal.

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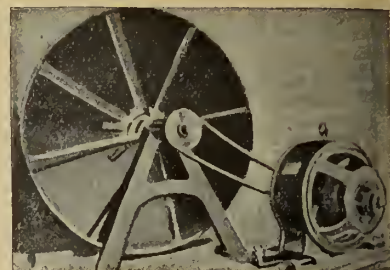


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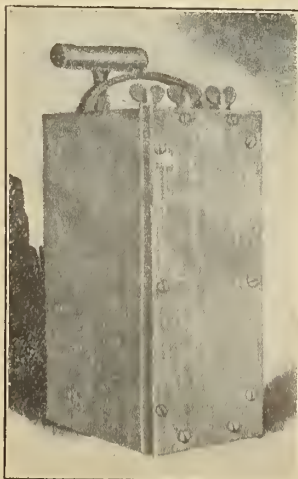
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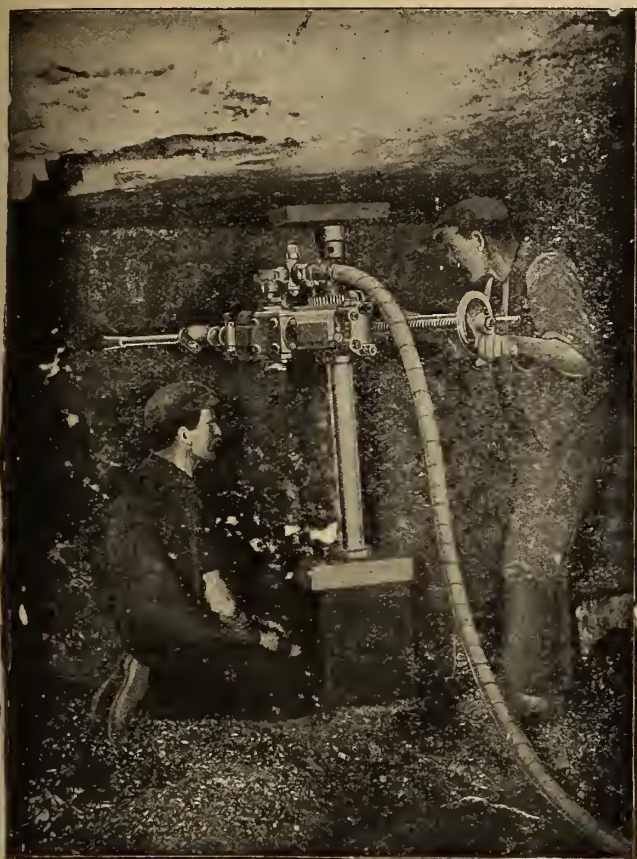
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BULLETIN 40

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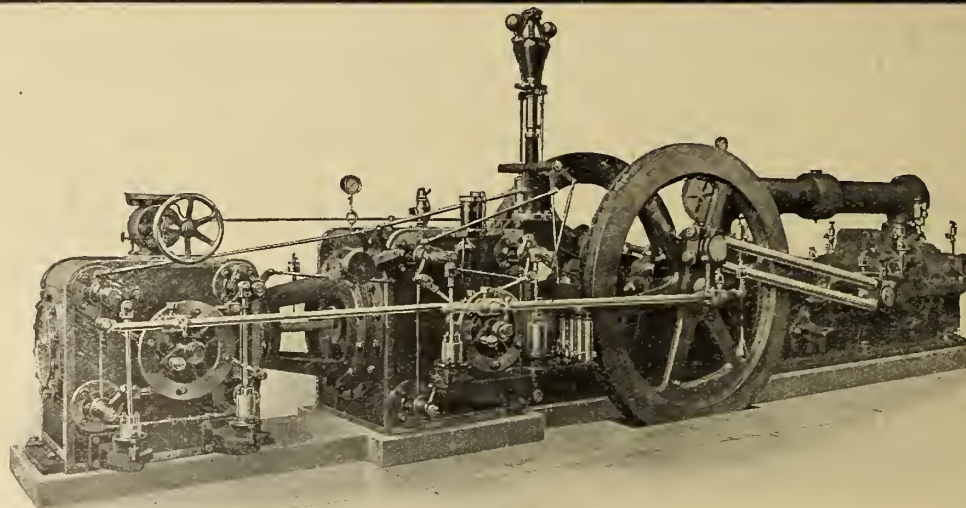
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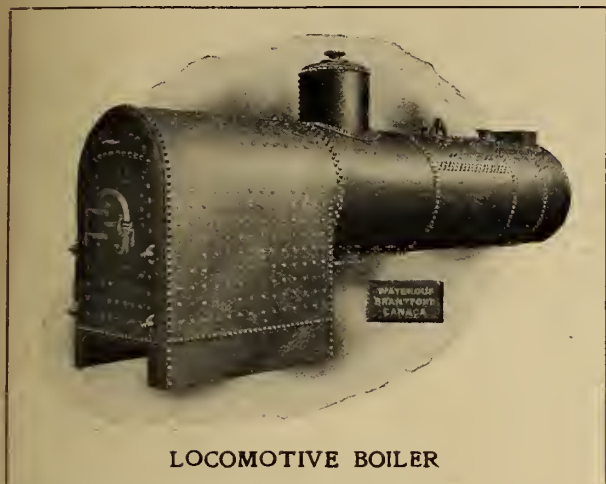
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"Little Giant"

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☐ Built in sizes ranging from 2" to 5½" Cylinder diameter, for all work from boulder breaking to submarine drilling.

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PAID-UP CAPITAL \$10,000,000 REST \$6,000,000

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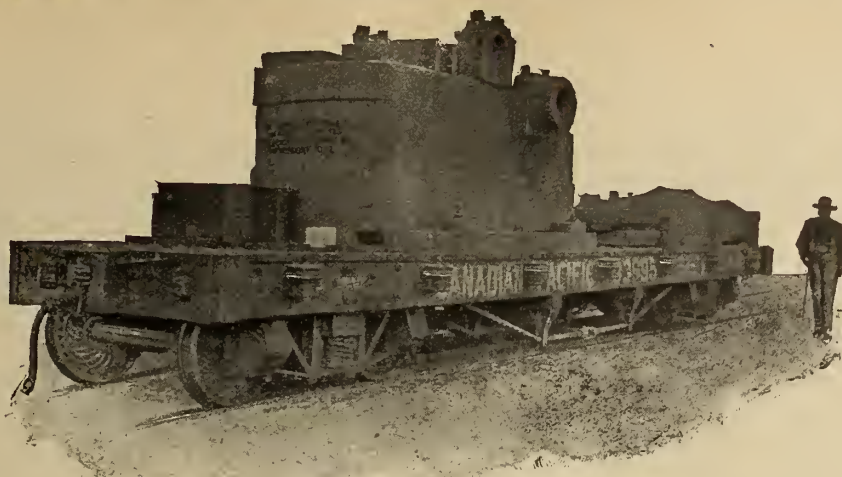
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A complete description, with strong illustrations of crushers and crushing plants, drawings and tables.

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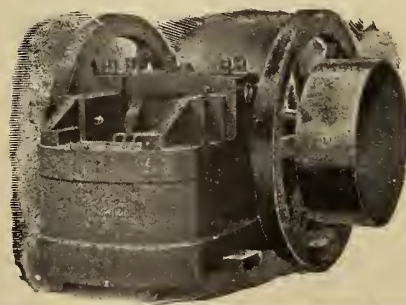
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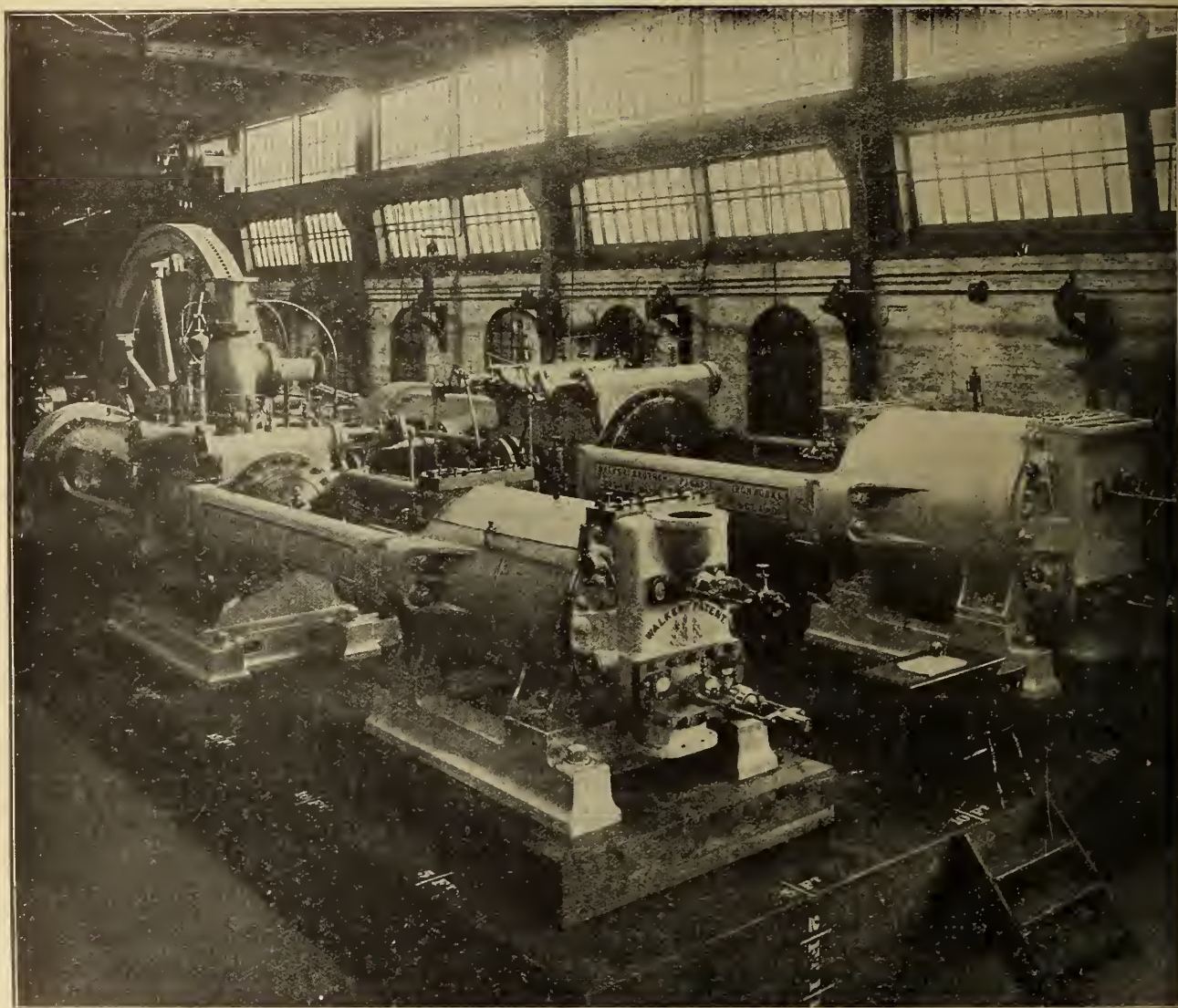
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are of **WALKER BROTHERS (Wigan) LIMITED** manufacture.

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is used for all the wearing parts. This steel is the supreme material for  
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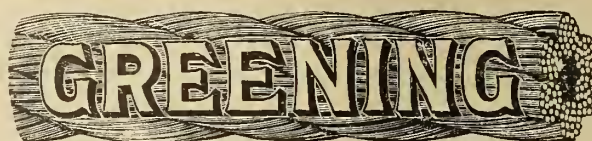
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The book department of the Canadian Mining Journal has a limited number of complete bound volumes of the Canadian Mining Journal (including index) for the years 1907 and 1908 for sale. Anyone wishing one or both of these volumes should apply at once to secure his order. The price is \$5.50 per volume or the two volumes for \$10.00.

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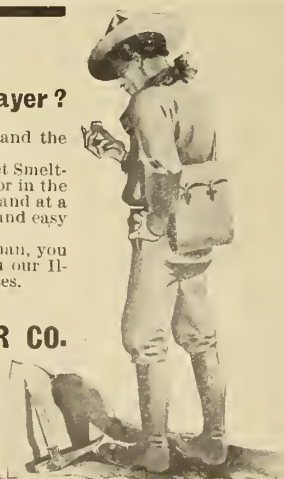
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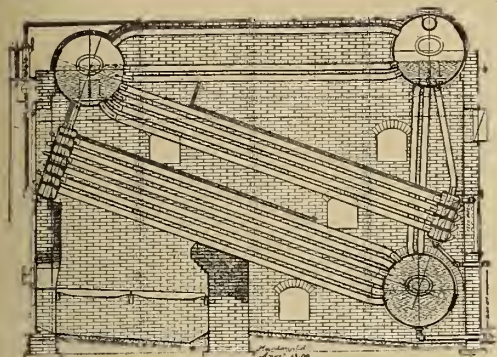
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Free expansion of tubes. Perfect water circulation. Dry or superheated steam. Half the usual number of handholes.

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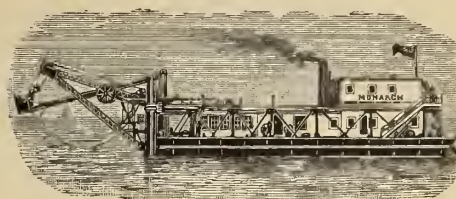
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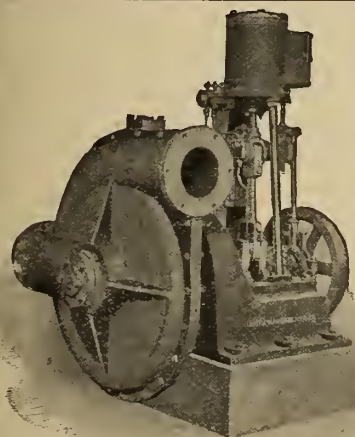
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Structural METAL WORK of all kinds**

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**Centrifugal Pumping Machinery for various Industrial Purposes**

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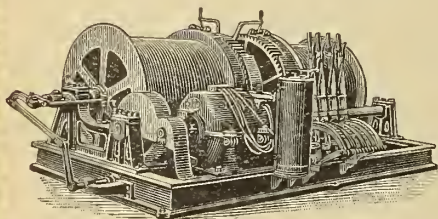
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The system embraces both dry and wet features and we are prepared to treat all ores.

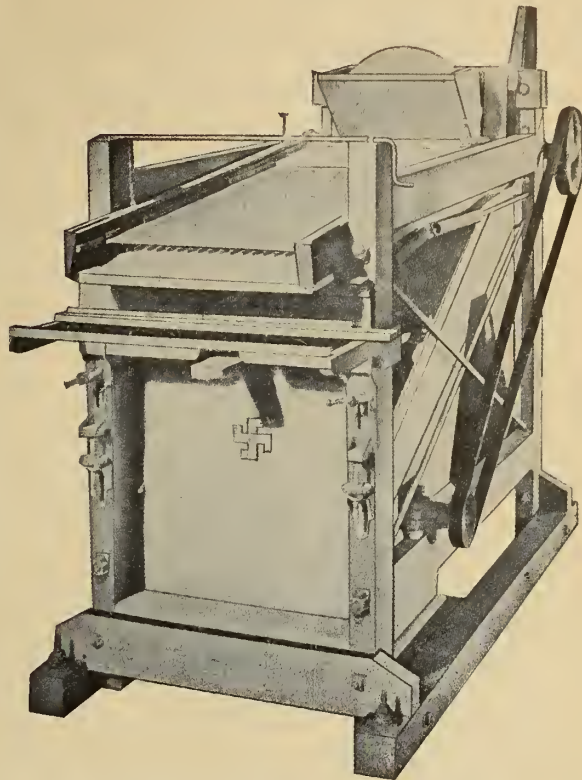
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Largest carbon ever found.  $\frac{1}{4}$  actual size.

NOTE. We personally break (in this country) our carbons, thereby enabling us to determine accurately their quality. We deal only in very best quality and are always ready to ship goods on approval and for selection to responsible parties. Write us.

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CONCENTRATES  
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Vancouver, B. C.



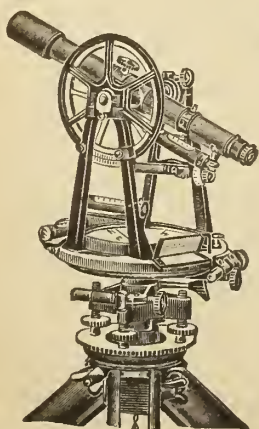
## CANADIAN MINING INSTITUTE

### NOTICE OF CHANGE OF ADDRESS.

The Secretary's Office and Library of the Institute have been removed to rooms 3 & 4, Windsor Hotel, Montreal, Que. Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a. m., to 1.30 p. m. and 2.30 p. m. to 6.00 p. m.

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Standard Instruments and Appliances for  
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Underground Work.

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Strength up to standard specification and permanent.

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Rampart Brand

SYDNEY, NOVA SCOTIA, CANADA



# Mine

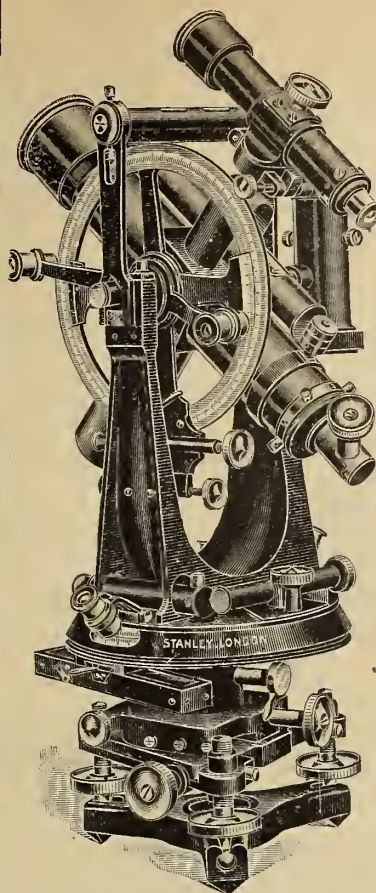
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# Bennett Fuse



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**The Giant Powder Company, Con.**  
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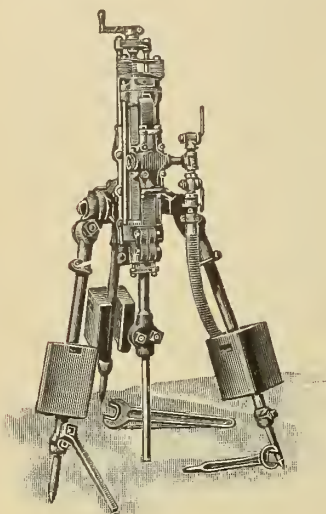
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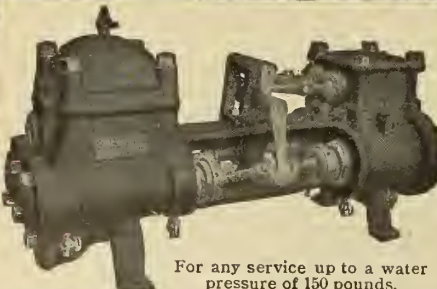
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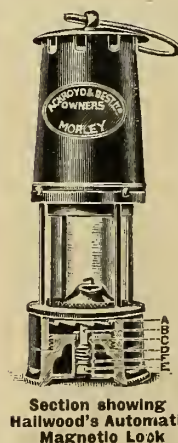
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# THE CANADIAN MINING JOURNAL

OL. XXX.

TORONTO, April 15, 1909

No. 8

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

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### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

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## NORTH AMERICAN CONSERVATION CONFERENCE.

It is no exaggeration to affirm that the North American Conservation Conference is the official beginning of a movement that will affect profoundly the future history of Canada and this continent generally.

Sessional Paper, No. 90, issued by the Dominion Parliament, embodies a Declaration of Principles as drawn up by the Conference. The opening paragraph runs thus: "We recognize the mutual interests of the nations which occupy the Continent of North America and the dependence of the welfare of each upon its national resources. We agree that the conservation of these resources is indispensable for the continued prosperity of each nation." Then, as summing up the spirit of the Conference, we find this:—"We agree that those resources which are necessities of life should be regarded as public utilities, that their ownership entails specific duties to the public, and that as far as possible effective measures should be adopted to guard against monopoly."

The paper then proceeds to define its attitude towards public health, forests, waters, lands, minerals, and protection of game.

We have especial concern with the section on minerals. It is proper, considering the importance of the matter, to quote the full text of this section:—

### Minerals.

"We recognize the mineral resources as forming the chief basis of industrial progress, and regard their use and conservation as essential to the public welfare. The mineral fuels play an indispensable part in our modern civilization. We favour action on the part of each government looking towards reduction of the enormous waste in the exploitation of such fuels, and we direct attention to the necessity for an inventory thereof. Such fuels should hereafter be disposed of by lease under such restrictions of regulations as will prevent waste and monopolistic or speculative holding, and supply the public at reasonable prices.

"We believe that the surface rights and underground mineral rights in lands should be separately dealt with so as to permit the surface of the land to be utilized to the fullest extent, while preserving government control over the minerals.

"Regulations should be adopted looking to the most economical production of coal and other mineral fuels and the prolongation of the supply to the utmost. We favour also the substitution of water power for steam or other power produced by the consumption of fuel.

"Great economy in the use of fuel has resulted in the past from the application of scientific invention and the use of improvements in machinery, and further progress can be made in the same direction. We, therefore, recommend that all possible encouragement and assistance be given in the development and perfecting of means whereby waste in the consumption of fuel can be reduced.

"The loss of human life through preventable mining accidents in North America is excessive. Much needless suffering and bereavement result therefrom. Accompanying this loss there is great destruction of valuable mineral property and enhancement of the cost of production. The best method of eliminating these known and admitted evils lies in the enactment and strict enforcement of regulations which will provide the greatest possible security for mine workers and mines. We, therefore, favour the scientific investigation of the whole subject of mine accidents by the governments participating in this conference, the interchange of information and experience, and the enactment and enforcement of the best regulations that can be devised.

"Mineral fertilizers should not be monopolized by private interests, but should be so controlled by public authority as to prevent waste and to promote their production in such quantity and at such price as to make them readily available for use."

These declarations deserve careful attention. The Conference was called by the President of the United States. Delegates were present from Mexico, Canada, Newfoundland, and the United States. Their deliberations were conducted with one object in view. That object was to give strong impetus to the movement for the better conservation of our natural resources, and to excite international interest in that movement. In this, we believe, the effort will be successful.

To Canadian mining men the second paragraph quoted above will be instructive. Coming from a dignified continental committee, it carries large weight. Significant also is the reference to loss of human life through preventable mining accidents.

All thinking men will concur in hoping that the good work begun by the Conservation Conference will be continued.

### QUEBEC MINING LAW AMENDMENTS.

Quebec has moved slowly in the direction of better mining laws. For long there have been complaints from prospectors. Not alone is the present law unsuited to furthering the opening up of new mining districts, but in some cases it has actually deterred capital from entering the Province. Indeed the present law has a bad name, whether justly or unjustly is not for us to say.

The Quebec Department of Mines has not been

oblivious to this fact. Mr. Obalski, the technical head of the Department, has followed keenly for many years the trend of mining legislation in other countries. He has taken a prominent part in the discussions of the Canadian Mining Institute. The Hon. Mr. Devlin, the titular head of the Department, has made himself familiar with the needs of his Province. No doubt both of these gentlemen have had ample opportunity of learning the opinions of investors and prospectors regarding the present mining act.

Recognizing, however, that hasty and ill-considered changes are worse than any number of defects, the Quebec authorities have deliberated long. The bill now introduced by the Hon. Mr. Devlin will bring sweeping changes. It alters radically the conditions governing prospecting and acquisition of mining claims. The old prospecting license is to be done away with. It is to be replaced by miners' certificates, which will be issued by the Government on payment of a fee of ten dollars. Holders of certificates will be permitted to prospect all over the Province where the mining right belongs to the Crown, and where no previous right exist.

Further, following the Ontario Act, the prospector will be required to stake his claim in accordance with specific regulations, including a marked discovery post.

The changes outlined will become effective at the moment the bill is sanctioned. Holders of license under the present Act will not, however, be interfered with until January 1, 1910. After that date the amendments will apply to all alike.

So far as we are able to judge from the scanty information received, the Devlin bill is sound. The changes will make less thorny the path of the prospector, and we venture to predict that this summer will see more than usual activity in Quebec.

One crucial question, a question that the Quebec Department of Mines should approach with all possible care, is that of "discovery." We do not wish to refer harshly to that feature of the Ontario Act. But it is not improbable that Quebec may learn what to avoid in this particular respect by studying the operation of "discovery" requirements in her sister Province. Undoubtedly, on the other hand, Quebec can and will draw many good lessons from her western neighbor. We would also draw attention to the fact that British Columbia has an Act that works smoothly and well. Perhaps the highest praise that can be accorded that Act is the statement that there is little or no evidence of dissatisfaction. And, after all, what is needed is a minimum of legislation and a maximum of mining. An Act that covers scores of closely printed pages, an Act whose every clause is qualified and modified by endless riders, defeats its own end. Mining legislation, it is, or should be, designed to facilitate, not to impede the progress of an industry that is becoming more and more essential to the nation.



### ÆNEAS McCHARLES.

Æneas McCharles, the founder of the McCharles Prize, was born in Nova Scotia, where he received his education, and for some time taught in the public schools of the Province. He went out West sometime in the eighties and made money in Winnipeg by investing in real estate. He drew out with something to the good when the great boom burst, and settled in Sudbury, if the life of a prospector can be called settled. He joined a group of pioneers responsible for the exploration of the nickel range—hardy men, those pioneers, whose task is to march first and trace paths for the progress of the race.

His keen sarcasm, ready wit, and strength in debate made him a leader in much of the warfare against mining laws and other obnoxious legislation that used to trouble the prospectors of the north. But his familiar friends knew the warmth of his heart, and were always glad to smoke a pipe with him in the modest little building where he lived his lonely life. He was an indefatigable prospector, and had the rather unusual habit (among prospectors) of carving his name frequently on the trees. For many years he failed to make any money and lived on his dividends from Winnipeg. But his good fortune came at last. He sold the North Star mine to the Mond Nickel Co. for a sum that made him comparatively wealthy. But he did not change his manner of life in the least. His friends thought the loneliness and asceticism were not good for him. They were glad when he forsook his frying-pan and came to dine with them at the Balmoral.

The foundation of the McCharles Prize to encourage research, and the terms of his will in this connection reveal the essential largeness of his nature. The memory of Æneas McCharles will be kept green.

### A SOUTH AFRICAN DIVIDEND.

The Jubilee Gold Company, Limited, was organized in Natal in 1886. For three claims on the farm Turffontein, Witwatersrand, the company paid £9,000 in shares. Later it acquired more territory. Its authorized capital is £50,000 in shares of £1 each. All the shares are fully paid. It operates a 50-stamp battery, cyanide and slimes works, and other accessory plant. During 1908 the company reports 62,046 tons of ore crushed, yielding £86,781. Ore reserves, which are carefully developed, are reported at 178,567 tons.

Since the first year of operation, with the exception of the period occupied by the Boer War, the Jubilee has had a remarkable record in dividend paying. In no year has it distributed less than 25 per cent. in dividends. In 1894 the company declared distributions of 150 per cent. From 1903 onward the fortunate shareholders have received 50 per cent. dividends.

It is worthy of note that these enormous dividends have been made possible mainly by maintenance of ore reserves, along with careful elaboration of suitable

metallurgical processes. The company's aim has been to maintain reserve developed ore, amounting to about three times the tonnage crushed annually. The property is now estimated to have four years more to run.

### CANADIAN BANKING.

A fearless and decent newspaper or magazine is an incalculable blessing to any community. Collier's Weekly, Canadian edition, brought out recently an article on Canadian banking. The writer, Mr. Peter Ryan, speaks as one having knowledge. He makes a strong case against the branch system. He claims, and in this we concur with him most heartily, that the innumerable branch banks with which the Dominion is dotted, act merely as suckers by means of which the nation's savings are collected and transmitted to the large financial centres. He shows cause why the

### THE WORLD AND THE LIMIT.

Of all the influences that have told against the healthy development of Cobalt, Lorrain, Montreal River, Larder Lake, and Gowganda, the Toronto World has been the most pernicious. So indifferent has its management been to the consequences of wholesale wild-catting that it is now looked upon as the prime and proper channel through which mining fakirs must make their strongest appeal to the credulous.

We had thought that the Law tragedy, the Spears, Big Ben, Silver Mountain, and Aguanico incidents would have caused the World to cover its diminished head. But worse remained.

The Toronto World is not content with selling advertising space. Casuistry may justify the absence of censorship as regards its advertisements. No ingenuity can remove the stain of certain editorial lapses. Witness the following. On March 30 there appeared in the World a leaded reading notice, covering a double column space for the full length of the page. This notice was intended to be taken as an open declaration of the World's belief in Julian Hawthorne and all his works, including his Temagami-Cobalt areas—we had almost called them mining areas. In unmistakable language, as will be seen by referring to the accompanying cut, the World lent the seal of its approval to the most fantastic imposter that has yet inflicted himself upon Canada.

Julian Hawthorne, unworthy son of worthy Nathaniel, is a magazine writer. He is also a sublimated ass. Moreover, he has been shown up by one or two responsible mining journals in the United States. In fact he is so patently a pretender that we do not wish to waste more space upon him. Even to the oblique vision of the World the man must have appeared in his true colors.

Hence we must conclude that the Toronto World has accomplished the impossible—it has descended.

THE TORONTO WORLD

# on Favors Higher Prices

## JULIAN HAWTHORNE

Well-Known Author, Has Entered the

### Montreal River District on a Large Scale

RY

Tem-

Hawthorne Syndicate owns the Temagami-Cobalt Mines, Limited, The Elk Lake-Cobalt Mines, Limited, and The Montreal-James Mines, Limited, and is now branching out into the Shining Tree Lake and Welcome Lake districts.

It has, for some time past, been known to The World, and possibly also to the better-informed portion of the Toronto public, that Mr. Julian Hawthorne has been writing to friends of his in the States, inviting them to join him in a mining project in Ontario. Not until to-day, however, has full and trustworthy information on the subject been received.

This is due to the fact that, for reasons best known to themselves, Mr. Hawthorne and his associates have been conducting their operations very quietly; at any rate, they have thus far avoided publicity. So no mention of their proceedings has been made, and it was, indeed, by the merest accident that The World became possessed of the information.

#### THE TEMAGAMI-COBALT MINES PROPERTY.

The fact is, that the Hawthorne Syndicate has entered Ontario on a scale which might be described as stupendous. It is stated that the Syndicate, some time last September, started operations on what is known as the Diabase Peninsula, a white Diabase rock, within two miles of the Temagami railway, a piece of the road which has been uncovered since the line was

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seen, the Welcome Lake district, but an area equally large. It is reported that they have recorded more than 100 claims (4000 acres) in that district alone.

#### BRAINS, PUSH AND MONEY.

From these data it would seem that the Hawthorne Syndicate is backed, not only by pluck, energy and foresight, but by no end of money as well. For operations on a scale such as theirs require big money, and when it is realized that the money they are spending is their own, and that they are not organizing stock companies, it will be understood that it means, on their part, deep-rooted confidence in the future of the Ontario silver zone. For mining of this sort. The World is free to say that it entertains high respect. We deem it more than probable that American pluck and push are going to win out once more. The members of the Hawthorne Syndicate are people of the kind that makes history; and we should not be surprised if, in this instance, they made money, too.

Supplies have been forwarded for two camps of one hundred men—one camp at Shining Tree Lake, the other at Welcome Lake. As soon as the snow melts, the Hawthorne Syndicate will begin systematic prospecting of their immense holdings. It is certainly remarkable that, until now, nothing has been known of the operations of these men. If nothing else had drawn attention to them, it would be thought that the amount of machinery and supplies going into their properties would have done so. However, The World at last presents the facts.

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United States system of banking is better in principle than our own—better, that is, for the people. Nothing could be more delightful for the bankers than the Canadian system.

All of which has a direct bearing upon the mining industry. It is time that we heard less of Mexican and West Indian ventures begun and continued by Canadian financiers backed by Canadian banks. It is time that we heard more of Canadian coal-mines, iron-mines, and all varieties of mines receiving business-like support from our own banks. Perennial platitudes from the pens of bank presidents are about as satisfying as the east wind.

### "GEOLOGICAL HIEROPHANTS."

Our volatile contemporary, Mining and Scientific Press, whose editorial pages are a well-spring of delight, took umbrage at certain geological polysyllables used by Messrs. Ransome and Calkins. As ill-luck would have it, these honest geologists injudiciously herded a lot of obfuscating longinquitous verbiage into one paragraph. This was too much for our occidental coeval. In wrath it let fly at those geologists and called them the bad name that we have printed above.

Apparently the shot told, for, after many days, Mr. Ransome sent a pungent and impassioned reply from Washington, D.C., begging the editor for heaven's sake to quit his joking. Which the editor promptly did. In the interim a goodly lot of sprightly letters had appeared in the Press.

The net results of the incident appear to be that two geologists are sore, and all things else are in statu quo.

### APLITE.

We publish on another page an interesting note from Mr. N. L. Bowen, of the Kingston School of Mining. Mr. Bowen has determined definitively the mineralogical composition of the aplites of Northern Ontario. Hence future discussion will have a clearer basis on which to begin.

It will be remembered by readers of Dr. W. G. Miller's Report on Cobalt (3rd Edition, page 65) that he alludes to the similarity in composition between the aplites of the Montreal River District and the granite dike on the University property. Mr. Bowen confirms this specifically, and adduces the necessary analytical facts.

### EDITORIAL NOTES.

Le Roi mine, it is announced, has been closed temporarily. This implies also that the Northport smelter will be put out of commission. The Le Roi Company apparently is considering the acquisition of new properties wherewith to strengthen its ore reserves. There is every reason to believe that the suspension of work will last for but a short period.

Canada is not to have a Royal Commission on Mining. Instead of this the less costly expedient of a standing committee of the House of Commons has been resorted to. It remains with the mining fraternity to keep this committee busy.

### GOWGANDA NOTES.

The roads into Gowganda are still passable, but they will soon break up in the April sun. The lakes become impassable first, for even in the coldest weather there is a lot of water and slush under the snow.

Four boilers consigned to the Reeves-Dobie and the Boyd-Gordon Mines, are on the road from Sellwood. Considerable difficulty is being experienced in getting them in. They weigh about four tons apiece. It is doubtful if they will reach Gowganda before the roads break up.

The Bartlett Mines, Ltd., have their machinery on the ground and are at present installing it.

The O'Brien Mining Co. have their machinery in place and have erected some of the finest buildings in the camp.

There are about 500 teams on the road between Charlton and Gowganda, and about 200 on the Sellwood-Gowganda road. Teams are in such demand that the railroads (T. & N. O. Ry. and C. N. O. Ry.) are trans-



Scene at Stopping-place half way between Charlton and Elk Lake.

porting teams and sleighs free of charge to Charlton and Sellwood.

The great question in the minds of the prospectors and investors in the Gowganda field is: When is the Government going to build a waggon-road into the camp? A good summer road is an absolute necessity, as without it the development of the camp will be greatly retarded, and the public will lose interest in it when results are not forthcoming.

People remember the immense sums spent by the Dominion Government in making the Caribou and Klondike goldfields accessible. The Ontario Government should make some return for the large revenue they have derived from the Silver Country, and the best investment would be in a good road.

Blind pigs are flourishing in Gowganda. The latest census showed fifteen. A magistrate and one or two policemen are very much needed to keep down the liquor traffic and other forms of lawlessness which are developing rapidly in the absence of legal restraint.

Three assayers have opened offices, but are not doing very much business. The average prospector declares he has silver on his claim and does not want any assay to destroy his dreams of affluence.

JAS. D. CUMMING.



## A BRITISH VIEW OF WESTERN CANADA.

Part of John Ashworth's Report, read before the Manchester Geological Society.

Some miles to the west or south-west of Winnipeg we passed the lignite coal fields of Souris, but it was not on our programme to visit them, and it was not until we reached Medicine Hat in the afternoon of the 13th September that we came into close touch with the Prairie lignite coal field. Our call here had reference principally to the bore-holes put down for natural gas at a depth of 1,060 feet.

The following is a short description of the strata passed through:—

The first 600 feet of the boring, 10 in. in diameter was through water bearing strata and ended in a sandstone formation lying between blue shales. The diameter of the bore at the bottom is  $4\frac{3}{8}$  inches. The blue shales readily disintegrate when exposed to water and air. The pressure of the gas is about 556 lbs. per sq. inch, and the yield about a million and a half cubic feet per 24 hours. Although this supply has been drawn on for twenty-four years, it has not yet shown any reduction in the yield. The gas is used for all sorts of purposes, the price for domestic supply being  $13\frac{1}{2}$  cents per 1,000 cubic feet, and for business purposes 5 cents per 1,000 cubic feet at a pressure of 8 ounces per sq. inch. The Railway Reservoirs are charged up to a pressure of 175 lbs. per square inch. This gas is used very extensively by the C. P. Ry. Co. in their shops for all sorts of heating purposes, and has effected a saving of at least \$60,000 per annum on an outlay for boring of only about 4,500 dollars.

After leaving Medicine Hat we called at Dunmore Junction to inspect another gas well recently bored by the C. P. Ry. Co. The well is 1,075 feet deep and has a diameter of ten inches all the way down. The pressure is 580 lbs. per sq. inch and on the opening of the stop valve for our edification the noise was deafening while the gas was blowing off and rose to a height of 200 feet.

Our next scene of investigation should have been Lethbridge, which place was reached at seven o'clock in the evening, but the delay at Schrieber compelled the directors of our movements to leave the Galt collieries unvisited much to the disappointment of every member of the party.

Near Lundbrek, on the 14th September, we saw the first lignite and Bituminous colliery in the district, which is noted for its freedom from snow during the winter, and is, therefore, most suitable for cattle ranching.

After leaving this district we commenced the ascent into the Rocky Mountains and at Frank we were aroused at 5.30 in the morning to view what was probably the greatest landslide of the world. This has been fully described in the transactions of the associated societies, but no one can possibly realize the enormous power which was brought into action in a moment without personally visiting the site.

The coal seams at Frank are perpendicular and are still being worked in the same manner as before the great landslide took place.

Having skipped the extensive collieries to the north of Frank, which are not in sight from the railway, our next call was at Coleman to see the extensive developments at that point. Mr. O. E. S. Whitesides, the General Manager, had made elaborate preparations for the entertainment of his visitors, but these had to be curtailed into a run into the mine for about  $1\frac{1}{4}$  miles

on cars drawn by an electric locomotive. The return journey was made at express speed, at a speed, in fact such as no engineer in the party had previously experienced in a coal mine.

At Coleman miners use the Wolf Lamp with internal self-ignition, and Negro powder is used for blasting. The dip of the mines is about 30 degrees. No. 2 seam is a steam coal and 14 feet thick. No. 4 is a coking coal and 7 feet thick. No. 5 is a steam coal 14 feet thick. The roofs and floors are rock; the holing or mining is all done by hand. The extraction is by pillar and stall, the pillars being 60 ft. by 60 ft and the rooms 15 ft. wide; 200 ft. on the higher side of the road is left in as a support for the roadway. The output is about 2,000 tons per day and an Ottumwa box car loader is in use. The mine ventilation is maintained by two Capell fans. The coke ovens are of the beehive type.

As is the case with the Crow's Nest Coalfield, the mines at Coleman are in the Cretaceous measures. The seams of coal are not continuous, however, and there is a complete break in the section between Coleman and Michel, yet they doubtless belong to the same coalfield.

When at Coleman the Crow's Nest mountain may be seen to the north, remarkable from the fact that this huge mass of limestone rock is out of its geological position.

At our next point of call a very hurried opportunity was given to view the surface arrangements of the Hosmer Mines. Here are thirteen seams of coal varying from 4 to 30 feet thick and these are being recovered by a tunnel driven at right angles to the dip of the measures and starting in about 600 ft. above the railway track. There are two parallel tunnels, the larger one being in three sections or compartments, two of which are for haulage, and the third one a travelling road and a pipe way. The other tunnel is for the return air. The tunnels have been driven in 3,400 ft. and have crosscut seven seams. The dip of the seams varies from 65 to 35 degrees. The first 847 feet of the tunnels is driven through the Fernie shales which form the basis of the coalfield.

The ventilation of the mine is effected by a Walker Fan 20 ft. by 9 ft. and can be used either as an exhaustor or as a blowing fan. The haulage is effected by compressed air locomotives. Wash house, baths and lockers are provided for the miners. The mine cars are constructed to hold 2 tons each. Two hundred and forty coke ovens are calculated to give an output of 300 tons of coke per day. During the forest fire, which destroyed Fernie, these coke ovens were made use of by the fugitives and many lives were saved.

Under the terms of their purchase these mines could not commence to ship coal until after the 1st December, 1908.

Our next stop was at the fire devastated town of Fernie. Of the old landmarks only the offices of the Crow's Nest Pass Co., Ltd., remain and a few houses at the western end. This is the third time that Fernie has been partially destroyed by fire. The Coal Creek Mines of the company are situated up the creek of that name about five miles from the town, and during the afternoon a number of our party visited the mines and went underground, whilst the majority contented themselves by viewing the surface arrangements.

Practically all the mines belonging to this Company are in British Columbia, and have an acreage of 250,000.



They are opened and in course of development at three points, viz.: Michel, Coal Creek, and Carbonado, or Morrissey. The measures dip mainly to the eastward at an angle of about 30 degrees, and further to the east become flat.

The capital of the company is \$10,000,000, and the output of the mines is equal to more than a million tons per annum. The coal is highly bituminous, the small coal being made into coke and supplied to the smelters both in Canada and in the States. It has 1,128 coke ovens equal to an output of 2,000 tons per day, and finds employment for 2,470 men.

Wolf safety lamps are used in all the Company's mines and as a souvenir of this visit one of these lamps was presented to each visitor by the First President of the Crow's Nest Pass Coal Co., Ltd., G. G. S. Lindsay, Esq., K.C.

The attention of some of the visitors was called to a serious accident of a somewhat unusual character which had occurred in No 2 mine at Coal Creek, and doubtless this was the reason why some of the party were anxious to make an underground inspection.

This mine has been developed principally on the pillar and stall system of extraction, but the pillars are very irregular in size and some little longwall has been tried. The mine, though it has a general dip towards the east, is by no means on a level bed, there being a syncline and also an anticline, and it was on top of the anticline that "bumps" developed. Some of these bumps caused fatal accidents and engendered a scare amongst the miners. During the summer of last year the most serious bump occurred in the main haulage way and closed in the road, shutting off 24 men who were in that portion of the mine. After very strenuous efforts on the part of the management 22 out of the 24 were rescued alive about two days afterwards. This bump affected the floor principally, and as being of a soft nature, it was squeezed up to the roof and a considerable volume of fire damp was given off. The general opinion was that the pillars were too small and hence that there was too little support for the superincumbent weight of the mountain above, which at this point would give a cover of about 3,000 feet. The management have been practically compelled to abandon the developed workings on the pillar and stall system, and to open out new districts on what is termed "retreating longwall," that is to say, the mine is to be divided into districts with separate panels, each panel being 900 by 900 feet, and the pillars between the panels are to be 100 feet wide and the pillars left to support the levels and haulage road are to be not less than 300 feet thick.

The different modes of working the coal seams of this coalfield might evoke a very interesting discussion, because the coals are of a very soft nature, and the mines are gaseous and in some cases as the one reported to this Society by my brother, Mr. James Ashworth (Notes on the Crow's Nest Coalfield, 1905; also Inst. of M. E.'s volume xxix., and on outburst of Gas and Coal at Morrissey), the coals are subject to huge outbursts of fire damp and fine coal dust. Although the mines are worked from adit levels, yet the mountains rise so quickly that most part of the seams at Coal Creek may be taken to have a cover of 3,000 feet. The roof in all cases is hard and the gas appears to lay in the floor strata principally. There cannot be a doubt but that the miners here favour the pillar and stall method of working.

Time did not permit of very close investigations of

the possibilities of this coalfield, and we were early next morning en route for Moyie to visit the largest silver lead mine in Canada. The crude ore of the St. Eugene Mine contains about 18% of lead, but the ore is concentrated before shipment, and as sent to the smelter contains about 65% of lead and 32 ounces of silver to the ton. The output last year (1907) was 607,000 ozs. of silver, and 27,000,000 lbs. of lead. There are two principal parallel veins, and the bottom level is the 1,900-foot level or 4,000 feet from the top of the mountain. The ore of this mine would be more valuable if it were not for its zinc content.

Shortly after leaving Moyie, one of our geologists who knows the district assured us that there was plenty of alluvial gold amongst the gravel of the river bed, but it would require heavy machinery to deal with it on account of the size of the boulders.

Our stay at the city of Nelson was too short to visit the mines or the Electrical Zinc Smelter, but we called at the Bonnington Falls to visit the West Kootenay Power and Light Co.'s plant. There is no trouble here regarding the destruction of the scenic beauties of the falls, and the electricity produced is carried off at a high tension right away to Rossland. The power applied is 4 units of 8,000 h.p. each.

Our next call was at the Rossland Power Smelter. Some 10 to 15 tons of lead piping is made here every day, the workmen being mostly Italians. The Trail Smelter is the oldest copper reduction works in the Kootenay, having been erected in 1894. The lead product from the furnaces is refined electrolytically.

The electric current from the Bonnington Falls is received here at a pressure of 20,000 volts. The horse power of the motor in use is 3,000.

From Trail to Rossland, where we paid our next visit, the rail track rises 2,000 feet in 13 miles. At the noted Le Roi Mine we went down to inspect the 1,650 foot level and stopes. The shaft is an inclined one and the cage is fitted with a safety catch arrangement to arrest its fall in case of the rope breaking. We also visited the Le Roi No. 2 or Josie Mine, and descended to the 500-foot level. Here we saw a diamond drill at work boring down to the 700-foot level. Following this visit we also descended the Centre Star to the 1,650 level, the mine having a total depth of 2,300 feet. The haulage machinery is strong enough to haul from 3,000 feet, and the engine draws at the rate of 1,000 feet per minute.

The day we spent at Rossland was one of the most strenuous of the whole trip, and, in fact, did not end until early the next day, when our entertainers saw all aboard for Trail, at which place we went to bed in our own sleepers and the train journeyed on to Greenwood, where we arrived on September 17th, to inspect the Mother Lode Mine, belonging to the British Columbia Copper Co. This claim was staked in 1891. The output is about 1,500 tons per day from the Glory Hole, and about 240 men are employed at the mine.

The copper ore obtained here is self-fluxing in the furnaces. From the mine we passed on to the smelter, which commenced its profitable career in 1889. The three present furnaces have each a smelting capacity of 650 to 750 tons per day.

We were told that nowhere in the world are ores containing so little copper (sometimes only one per cent.) successfully smelted without concentration.

Our next visit was to Phoenix, where we commenced our inspection of the Granby Mines. At these mines there is said to be twenty-million tons of ore in sight.



We travelled to the end of the 4,000-foot level at a height of 2,500 feet. The highest altitude of the mine is 5,000 feet. In one of the stopes we met with a surprise as we were suddenly confronted with Mephistopheles armed with a trident and amidst a roar and a smoke his satanic majesty disappeared from our view.

About two tons of dynamite are used daily in the mines and the output was expected to reach one million tons for 1908.

Each visitor was presented with a copper cup as a souvenir and after a most pleasant visit we left for Grand Forks en route for Nelson, and a call was made at the Bonnington Falls for the benefit of some members of the party to take snap shots.

From Nelson we took passage by the Kuskanook, and the charm of the scenery and the rest after the hurry of the last few days was as one member said a sort of Paradise.

At Ainsworth we called to see the Blue Bell Mine and the concentrator, which is under the management of a past president of the Canadian Institute, Mr. S. S. Fowler. This mine is one of the oldest in the Kootenays, having been worked by the Hudson Bay Co. 85 years ago for the purpose of getting ore to manufacture into bullets. The mine is now a low grade lead-zinc property.

Returning to Nelson we were entertained on board by Mr. Leslie Hill, Chairman of the local Reception Committee, and others, and afterwards at the club by the members, leaving later in the day by train for West Robson, where we again took steamer and landed the following afternoon at Arrowhead, and again entered our cars which had been ferried right up the lake.

En route for Vancouver, we passed the newly-developed coalfield at Nicola, and many other interesting mining features whilst steaming down the side of the turbulent Fraser River, which in some places almost fights for the small strip of land appropriated by the railway track. Vancouver was reached on the 21st, and with little delay we again took ship and arrived at Victoria at the far end of our western trip in the dark. The next day was devoted to a meeting of the Canadian Institute in the Parliament Buildings and the reading of papers, receptions, etc.

It has been reported that coal had been discovered under the city of Victoria, but we heard nothing and saw no borings during our stay.

After the preceding day's enjoyments and rests we left Victoria with much regret on Thursday, the 26th of September, by the Esquimaux & Nanaimo Railway, constructed and at one time owned principally, if not entirely, by the Dunsmuir family. On parts of the route hereabouts the scenery is very fine, and reminded us of parts of the Rocky Mountains.

Unfortunately time only allowed a very short stay at the Tyee Copper Co.'s smelter. This smelter has paid good dividends and the mechanical arrangements to save cost were said to be in some cases unique. The element of time again interfered with any chance of visiting the metal mines from which the Tyee Smelter receives much of its ore.

At Ladysmith the Dunsmuir family have large interests and here there is an ample provision for the quick shipment of coal from large bunkers on the side of the quay. Here, as also at Nanaimo, the railway trucks are loaded at the collieries and then ferried across to the mainland on huge scows, towed by a tug. The Ladysmith mines (coal) are not close to the port, but were passed by further north on the way to Nanaimo.

It may be remarked at this point that there is great demand for Asiatic labour, mainly Chinese and Japs, both on the surface and also underground at the mines on Vancouver Island. A Jap can be put to work which a white man will not do, and, therefore, it is clear that the Jap is a greater menace to white labour than is the Chinaman. Already there are thousands of Japs in the city of Vancouver.

On arrival at Nanaimo we were met by the Mayor, the local committee and the staff of the Western Fuel Co., with their chief, Mr. Thos. R. Stockett, and many other influential people. Some of our party visited other collieries whilst others went to the Hamilton Powder Co.'s works under the guidance of Mr. Burnham.

Just after the Western Fuel Co. took over the collieries the whole of the plant at the No. 1 or Esplanade Colliery, was destroyed by fire, and, therefore, the newer erections are quite up to the most modern practice for the economical handling of the output. The Headgear is of wood and about 80 feet high to the pulley centres.

The Brechin Mine was also visited, but the Colliery on Protection Island could not be brought into the programme. The thing that probably struck most visitors was the thin cover which separated the mines from the sea, especially at the Brechin pit or incline. The No. 1 Mine is 610 feet deep. Ventilation is secured by a Cappell fan of 11 feet 6 inches diameter, and at the No. 1 a Sirocco fan of 300,000 cubic feet capacity is being put down to replace a Guibal fan of 36 feet diameter. The output is about 700,000 tons per annum. Coal cutting machines are in use at these mines. The first seam is 7 feet thick, and No. 2, which is 70 feet lower,  $3\frac{1}{2}$  feet thick.

The city entertained us at dinner in the evening. Each visitor was presented with a pretty metal ash tray on which is shown the local Bastion and the word Nanaimo, as a souvenir of this enjoyable visit. After a good night's rest we were disturbed at an early hour and left this hospitable island at 7 o'clock by the s.s. "Charmer." We arrived at Vancouver, where we were met by the Provincial Mineralogist, Mr. W. Fleet Robertson, who had only just returned from his annual trip of exploration into the wildest parts of the interior.

We then drove around the city in automobiles, and were afterwards entertained at the Vancouver Hotel by the City Corporation, Board of Trade, Stock Exchange and resident members of the Canadian Mining Institute, at which 300 persons were present, and we started on our return homewards by train, leaving at 5.15 p.m. The events of our journeyings were discussed on the train, and at Revelstoke four of our party, including myself, had to take a regretful leave of the rest of the party, and thus miss the grandest of the magnificent scenery through the mountains, the Bankhead coalfield and the cattle ranching display at Calgary. I may, however, remark before closing that the Bankhead Coalfield is a very remarkable one, although I did not visit it, for I am told that the coal lies folded in by Carboniferous limestone, that is to say, there is a limestone as a base and limestone as the surface.

Thus came to a conclusion one of the most enjoyable trips a man could possibly have, accompanied with kindred spirits and every reasonable information on everything there was to be seen, and as to the country wherever we happened to be.

On my return, via Nelson, through the kindness of Mr. Irving and others, I visited the Canadian Zinc Com-



pany's Smelter, at that place, from which great results are anticipated. The electrical power is supplied from Bonnington Falls, and the Company hoped to be producing from 4 to 5 tons per day at an early date. I am glad to note from the Canadian Mining Journal, dated February 1st, that this smelter is now treating ten tons of ore per day, and having passed the experimental stage, the Company are intending to increase its capacity to 30 tons a day, the ore so far treated has averaged 10 per cent. of zinc, 10 per cent. lead, 12 ozs. of silver and 1.5 per cent. of copper per ton. This smelter will prove a great boon to the district, as in the past the Mining Companies have been greatly handicapped on account of the ores containing such a large percentage of zinc, consequently metallic mining in this district will be greatly increased.

I also inspected the Westmont Silver Mine, situated up Ten-Mile Creek on the east side of Slocan Lake.

Mr. Griffiths informed me that single-handed for many years he drove the tunnel and passages into the mountain, at first with no satisfactory results, when after great expenditure of time and labour he at last struck ore. With the financial assistance of a gentleman at Toronto, the further development is proceeding

and in the near future a successful mine will be, in all probability, established. I may mention that this mine is situate 5,400 feet above sea level. The ore produced up to the present time has more than paid for development work and has yielded from 150 oz. to 438 ozs. of silver to the ton.

Eventually after further extended journeyings on the American Continent I returned home, via New York, greatly improved in health and my mind enlarged with many useful facts and recollections of a hospitable people and their surroundings, which will last as long as memory remains.

Whatever I may have said regarding the resources of the Dominion of Canada is quite inadequate to convey a true impression of the greatness of this part of our Empire, and to those who are interested I strongly recommend a personal visit.

I conclude by again stating that I received the greatest courtesy from the members and officials of the Canadian Mining Institute to whom I tender my hearty thanks and to my colleagues for electing me as their representative, and my desire is that Canada ever continue to be an integral part of the British Empire.

## WANTED—AN INVENTORY OF PROMISING MINERAL CLAIMS.\*

R. W. Brock.\*\*

In the admirable address delivered by Mr. Marriott at the banquet to the visiting mining engineers at Vancouver, last autumn, he outlined a scheme for acquiring a record of the location of pay grade ore in new districts by a system of bonusing the prospector who gives notice of such an occurrence after the find had been inspected and certified to by a responsible officer. This recalled a suggestion along somewhat similar lines I made to this Institute a decade ago. As this now has the endorsement of so experienced an authority in these matters as Mr. Marriott, I venture to again bring the subject before the Canadian Mining Institute for consideration.

For a rapid development of the great mineral resources of the country—and for a great part of Canada the mineral development is the necessary precursor of the development of its other resources—there are three outstanding needs, an army of real prospectors, a large corps of well-trained professional experts, and capital. Unless there is a sale for prospects you will not have an army of prospectors; unless there are engagements for them, you will not have a large corps of professional men; so that the primary need would seem to be capital. A great deal is, therefore, said about the need of foreign capital to develop our mineral resources. But there is money here in Canada available for this purpose, if you can only call its attention to promising prospects. If we have our own money finding profitable investment in mining lands, we shall not need to raise our voices very loudly to turn foreign capital this way. It will come whether we want it or not.

We have in Canada magnificent opportunities for the investment of capital in mining enterprise, in small or large amounts. We all know that, but if, say, our secretary is asked by capital to point out a good investment, he will probably be forced to give a general answer, such as around Cobalt or in the Boundary Creek district. If the capitalist, acting on this advice, sends his representative to the camp to look up such a property, there is a strong probability that his time, his patience, his endurance, and possibly his money, will be exhausted looking over wildcats, and he will depart without doing business, under the conviction that nothing good is in the market. The investor needs some certain and expeditious way of getting track of suitable properties to develop.

On the other hand, the prospector's work and life cuts him off from "connections." He has little opportunity of meeting possible buyers, and seldom knows how to bring a deserving prospect before the notice of bona fide investors in such a way as to interest them. The company's engineers on the lookout for prospects have been on too many wild goose chases to be much impressed by a new prospector's tale, should the prospector by any chance happen to get an opportunity to relate it. So that, except on the crest of a boom, a prospector has great difficulty in disposing of his claim. No matter how good, it is of no use to him or to the country unless he can get in touch with money that will take it over and convert it into a mine. The prospector, therefore, stands in great need of some medium whereby his claim will be brought to the attention of development companies. This is particularly necessary in Canada, where the majority of the ores are low-grade, and the natural difficulties too heavy for any prospector to overcome. The great need, therefore,

\*Paper read before the Canadian Mining Institute.

\*\*Director of the Geological Survey of Canada.



seems to resolve itself into some method of introducing the man with capital to the man with the promising claim.

My suggestion was that there should be local centres, such as boards of trade, mining recorders' offices, local branches of the Canadian Mining Institute, etc., at which a prospector could file a statement, giving an exact description of the location of his claim, which would enable one to find it, an address by which he could be reached, the dimensions of his ore body so far as determined, the character and value of the ore, the terms he would accept, etc. Statements regarding dimensions and value might not be very convincing if made by the prospector himself, but if in the form of a certificate from a responsible disinterested technical man, they would be valuable, and, if favourable, would be sure to attract investors.

Copies of the statements on file at the local centres could be forwarded to the Provincial Department of Mines, and from the Provincial Department of Mines copies could be secured by the Federal Department of Mines, and by the Secretary of the Canadian Mining Institute. Such information at accessible points would be invaluable to the company or individual looking for investments.

The cost to the prospector of having his claim sampled is perhaps the chief obstacle in the way of the successful operation of such a scheme. If once under way, the certainty of attracting buyers would probably induce prospectors to use every effort to get "into the game." To help out the prospector on the financial side, mining engineers might do this work, when convenient, at a special rate, for the existence of such lists would be of great value to them. Assayers, particularly in provinces where they are licensed, might also be used by prospectors to acquire the information and furnish certificates. For the certificate of a responsible assayer with a reputation to maintain, that he had visited a property, found an ore body of such-and-such dimensions, sampled it carefully, and found that his samples representing so many feet of vein yielded such-and-such values, would be sufficient evidence of the worth of a claim to justify an inspection by a would-be investor.

A further inducement to prospectors to have such a report made on their claims might be given by allowing the cost of the examination to count towards the annual assessment, just as in British Columbia the cost of surveying a claim is accepted in lieu of assessment work.

Such an examination would benefit the prospector in many ways. A technical man on the spot could give the prospector valuable advice as to the most effective way of opening up and proving his claim. A concrete demonstration on his own ground would do more for the prospector than any number of text-books or mining classes. Most prospectors need and would welcome such assistance. It is pathetic to see a sincere and energetic prospector spending his few sweat-earned dollars and the best years of his life doing work on his prospect that is not developing it, but is detracting from rather than adding to its market value. This country cannot afford to have that man's energy and effort wasted. It's far too valuable. It should be directed so as to secure definite results, to prove that here is or here is not a valuable piece of ground. Prospectors may not always be ready to accept advice when they get it free, but a person sets greater store by something that he pays for.

The examination and report would be valuable to a prospector in helping to describe whether his claim was worth further attention or not, and the sooner a prospector can discover this the better. If good, he will go at the development with greater vigour; if bad, the sooner he finds it out and hitches up to a new claim the better.

Not every good claim would yield attractive returns if sampled in the early development, but it will usually have some earmarks which would encourage the prospector to stay with it. We know, of course, that the faith which removes mountains may sometimes make a mine out of a discarded claim, but the man with that faith is not going to be staggered by an adverse report.

Altogether, the prospector will find such a report a good investment. Development companies would find the lists a great boon. Indeed, I fancy if such lists were available, a large number of development companies would be formed to go in for this most profitable business. Proved properties, the product which the development companies would place on the market, are what foreign capital is looking for.

#### DRAFTS IN STEAM BOILER PRACTICE.

In a preliminary bulletin issued by the U. S. Geological Survey, many important facts concerning steam-boiler practice may be gleaned.

Experiments made seem to indicate that it is possible to double or treble the capacity of a plant without making any radical changes in the furnaces and boilers. These increases require about double and treble the quantities of air to be put through the fuel beds and boilers. It is also probable that rebaffling the boilers will often permit the capacity to be doubled or trebled, while still getting more steam than formerly per pound of coal for uses outside the boiler room.

The experiments were undertaken with the object of clarifying ideas concerning the passage of air through fuel beds and boilers. Measured weights of air were passed through two beds of lead shot, in series, one of which remained always the same and represented a boiler; the other being varied as to size of shot and depth of bed, and represented a fuel bed. Careful observations were made of the weight of air passing through the beds per minute. All data were plotted in many charts, so as to permit the study of them from several points of view. A number of laws were deduced bearing on the relative amounts of power required to force air through fuel beds of various thicknesses, composed of various sizes of coal, and through boilers of various lengths and areas of gas passages.

It may be possible, as a result of these investigations to raise the rate of working the boiler heating surface to three or even four times its present value. Such an increase would undoubtedly mean new designs of grates, furnaces, and boilers, especially fitted for high rates of working.

At the Zinc Corporations' works, Broken Hill, New South Wales, during January, 1909, 16,560 tons of zinc lead tailings were treated in Elmore vacuum plants, succeeded by Wilfley tables. The original dumps contained 20 per cent. zinc, 5.7 per cent. lead, and 8 ounces silver, per long ton. The "vacuum" concentrate assayed 43 per cent. zinc, 11 per cent. lead, 17 ounces silver. A recovery of about 90 per cent. of the zinc, 73 per cent. of the lead, and 85 per cent. of the silver was shown. The average cost of the whole treatment is given at 5s 7d per ton.



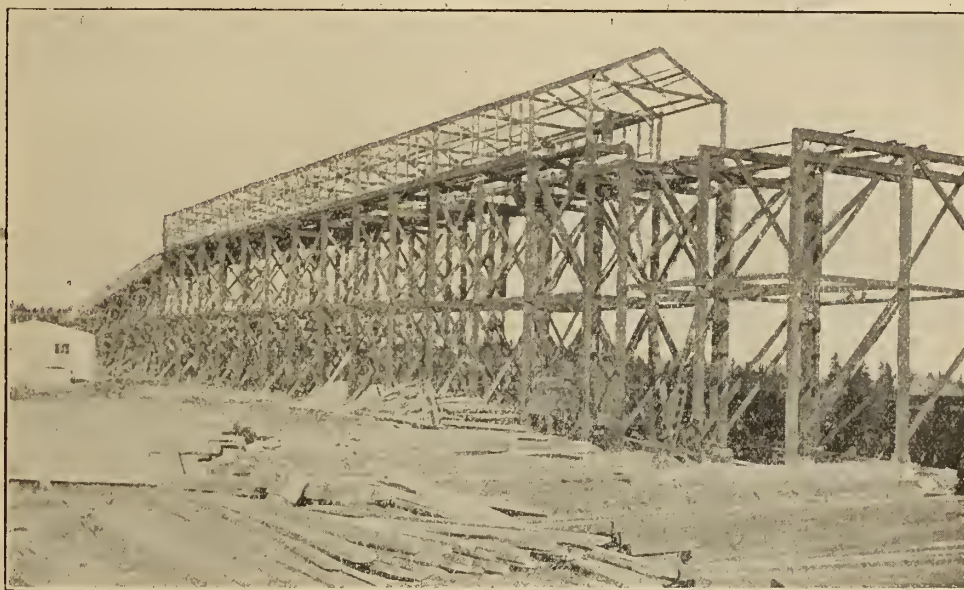
# THE MINING OPERATIONS OF THE DOMINION COAL COMPANY.

By F. W. Gray.

(Continued from issue of March 15, 1909.)

The mine at the present time has natural ventilation. The foundations for the permanent fan are constructed, and the fan race and air shaft are both complete. The air shaft is 10 ft. by 14 ft., and is concreted for the entire depth, 50 feet from the surface. The centre of the shaft is 32 feet from the centre of the fan, the small offset being concreted up to the fan discharge. The fan will be a Walker "Indestructible," 11 feet diameter, with a rated capacity of 150,000 cubic feet per minute, with 2-inch W.G. It will be driven by a Walker engine, non-compound, cylinders 14 inches by 30 inches, with 2 feet 6 inches stroke. The power will be transmitted by rope drive, five 1½-inch cotton ropes. The fan itself will be cased in steel and concrete. The house for the engine will be of

the bankhead by the haulage rope, and will be conveyed to the tipples by means of car pullers, which consist of an arrangement of chains and hooks. Passing out of the tipples the cars are automatically "kicked back" towards the mine, and are drawn by empty car-hauls to the brow, where they are made into trips and lowered once more on to the haulage rope. The coal is dumped by the tipples into hoppers, from which it is slowly fed on to a double battery of shaking screens, passing thence to two picking belts 5 feet wide and 40 feet long. From the picking belts the coal is passed on to a loading belt, which deposits the coal into the railway cars by means of a lowering "jib," thereby avoiding any breakage due to the fall into the cars. The screening plant is to be driven by a 12-inch



Dominion No. 12—Bankhead in Course of Construction.

entirely fireproof construction. The whole arrangement will be similar to that recently put in at No. 6 and previously described.

The haulage for some time to come will be effected by a 14-inch by 20-inch Jenckes hoist, which was formerly in use at No. 6. Later, when the mine is more developed, a more powerful haulage engine will be put in, space being reserved for this in the general layout.

The bankhead, which it is expected will be completed in time for the opening of the 1909 shipping season, will be a semi-fireproof structure, built on concrete piers, with hard-pine timber-frame, concrete floors, and corrugated-iron siding and roof. The structure will be 560 feet long from the slope mouth to the centre of the picking belts, making the over-all length 610 feet. The main portion of the bankhead will be 32 feet across, and the picking belt house will extend sideways for a distance of 75 feet.

Trips of 30 cars will be hauled from the mine on to

12-inch Goldie-McCulloch engine, by means of shafting with manilla rope drive. The screening arrangements generally are very similar to those previously described at No. 5, 6 and 7 Collieries.

The colliery shops are more than usually complete because of the outlying position of the new collieries with relation to the Central Shops at Glace Bay.

The Machine Shop is a timber-framed building 30 feet by 48 feet long, covered with steel shingles. It contains a 24 in. by 16 ft. lathe, 25 in. shaper, 25 in. drill press, 8 in. pipe threader, small bolt and pipe threader, grinding machinery, etc., all driven by a 6 by 6 Robb engine.

The Forge and Carpenter Shop are in one building, timber frame covered with steel shingles, separated from each other by a 12 in. fire wall, equipped with underwriters' fire-door. Each shop is 30 ft. by 36 ft.

The Forge contains six brick forges and a 250 lb. Niles steam hammer. A Buffalo blower supplies the



forced draft. The Carpenter Shop is equipped with cutting-off and rip saws. A 6 in. by 6 in. Matheson engine drives the saws and blower.

The Warehouse is a 30 ft. by 60 ft. frame building, two stories.

The Wash-house is 60 ft. by 30 ft., and has 120 lockers. These, as will be seen from the photo, are of novel construction. The lockers are constructed with a skeleton framework and stout wire netting, with

constructed near the colliery by impounding the waters of Irish Brook, which flows into Barachois Pond, and it is intended to supply all the water required for the colliery and domestic use of the Nos. 12 and 14 Collieries. The pumping station at the dam is equipped with a 600 gallon Worthington compound-duplex pump, and will supply the two small colliery receiving reservoirs and the houses. The colliery reservoir at No. 12 will hold 750,000 gallons.



Dominion No. 12—Carpenter and Forge Shops.

steam coils underneath. The open network gives the building an airy and cleanly aspect, and everything being in full view, the accumulation of dirt or rubbish will be prevented, and there will be no danger of fire from contact of the steam coils with wood. The usual hot and cold water taps and hand basins will be provided.

The Lamp-house is a small structure, 16 ft. by 33 ft., equipped at the present time with 140 Ackroyd & Best

The fire protection water service consists of a 500-gallon approved underwriters' fire-pump situated near the boiler-house. The water supply is drawn from the small reservoir, and is connected by 1,400 feet of 6 in. fire mains supplying seven hydrants placed at all necessary points.

**No. 14 Mine.**—These slopes are situated a mile east of Dominion No. 12 on the same seam, and have been driven 600 feet down from the surface. The pitch



Dominion No. 12—Exterior of Wash House (to left hand) and Lamp House.

safety lamps, which have been used since an early stage in the mine development.

Other structures are the stables and two small oil-houses.

An office is being built to serve both No. 12 and No. 14 Collieries. It is a frame building 32 ft. by 24 ft., and contains a fireproof vault for the storage of papers.

The water supply is an adequate one. The main reservoir, with a capacity of 7,200,000 gallons, has been

of the seam is about the same as at No. 12. The plant is as yet only temporary, and no permanent structures have been commenced. The surface equipment of the mine will not be so extensive as that of No. 12, as many of the erections at the last-named place will serve the two collieries. Permanent construction work will not be undertaken until the summer of 1909.

Most of the work on the sites of the new colliery villages is well under way. The houses at present



under construction number 18, and 53 are already built and tenanted. In addition to this it is anticipated that 70 houses will be built in 1909.

**Other Coal Areas.**—In addition to the areas already described in detail in the Glace Bay and Langan-Victoria Basins, the Dominion Coal Company have large coal areas under lease at other points. In the Morien Basin they own the old Gowrie & Blockhouse property, covering six square miles, and also five square miles underlaid by the Tracey Seam near McDonald's Lake, near the edge of the coal measures of the Morien Basin. They own, also, thirty-five square miles of submarine coal leases under the waters of Cow Bay and Mira Bay.

The Dominion Coal Company further own twenty-five square miles of submarine coal areas situated near Point Aconi in the Sydney Mines Basin, to the north of the areas now being worked by the Nova Scotia Steel & Coal Company, which are underlaid by all the workable seams of the Sydney Mines Basin. These areas are virgin, and they constitute a coalfield not much inferior in value to the Langan-Victoria areas

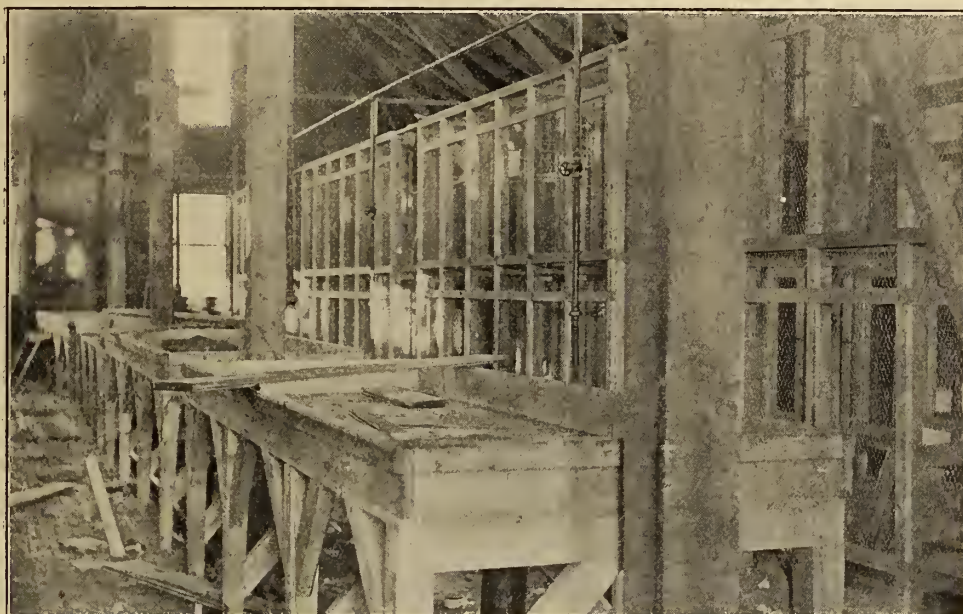
### Summary.

|                             | Tons (2,240 lbs.)   |
|-----------------------------|---------------------|
| Morien Basin .....          | 114,040,000         |
| Glace Bay Basin.....        | 527,560,000         |
| Langan-Victoria Basin ..... | 484,160,000         |
| Sydney Mines Basin.....     | 309,600,000         |
|                             | <hr/> 1,435,360,000 |

### THE WIDENING OF THE COBALT SILVER BELT.

Written for the Canadian Mining Journal by Frank C. Loring.

Cobalt proper, or that portion of Coleman and Bucke Townships embracing the three or four square miles of territory which is the producing area, has steadily increased its production, as well as its reserves. Probably 1909 will show a large increase over 1908. Reserves have increased as well as probabilities from future development. Exploration, especially at depth,



Dominion No. 12—Miners' Wash House, just before completion. Shows Clothing Lockers and Tables for Wash Basins, Taps, etc.

just mentioned. At this point the dip of the coal seams is about 6 per cent., or the same as that of the submarine seams of the Glace Bay Basin. The Coal Company's leases extend from the shorecrop of the Black-rock Seam near the Great Bras d'Or entrance for a distance of nine miles along the shore round Point Aconi to the edge of the N. S. Steel & Coal Company's holdings at Little Pond.

The Coal Company also own a submarine area off Cape Dauphin which bounds the areas of the New Campbellton Colliery.

The following summary of the coal contents of the areas controlled by the Dominion Coal Company was prepared by the late Dr. E. Gilpin in 1902, at which time Dr. Gilpin was Commissioner of Mines for Nova Scotia. No seams under three feet in thickness are included, and in making the calculation Dr. Gilpin stated that "the usual uniformity, regularity and freedom from faults of the strata and coal beds of this district permit of exceptional confidence being placed in any estimate of coal contents."

has been in several instances most important, and gives additional evidence that the district will be long lived.

Far greater attention is being paid to ores of lower grade, not of sufficient value to market crude but desirable for concentration. Undoubtedly there are extensive bodies of this class of ore which should yield large profits. The extent of these bodies of so called low grade ore is the best evidence of the strength of many of the veins, and, consequently, proof of their probable longer life in many cases.

Stimulated by the success of Cobalt, during the past two years there has been extensive prospecting both northwesterly and southeasterly, notably along the Montreal River near the present town of Elk Lake, near Maple Mountain, at South Lorrain, twenty miles south-east of Cobalt, and during the past year in the Gowganda and Miller Lake districts westerly from Elk Lake from twenty to thirty miles. Prices have often been greatly inflated, and, consequently, disaster and a probable reaction in sentiment will often result. Nevertheless, purely from a mining standpoint without



considering these artificial conditions, extraordinary effort is being made to develop these various districts and to ascertain their true value.

What is perhaps more extensively criticised than anything else in the development of prospects in that region, is the quantity of machinery ordered and installed before extensive prospecting has been done. This is in many cases for the purpose of boosting mining shares already marketed. Nevertheless, there is often good reason for this. What especially characterizes mining in that region as compared with other districts is the quantity of possible ore bearing veins. So long as any vein remains unexplored, no matter how small, there is warrant for additional work. A few tons of high grade ore return all expenditure. Consequently with the task set, the reasonable method is often to put in machinery.

Although surface trenching is desirable, in order to ascertain the number and extent of possible ore bearing veins, it has become more and more the practice to develop at depth rather than at the surface. Sometimes a mere crack when followed opens out into a profitable ore body. With dozens of these cracks known, there is often no other reasonable way than to attack the problem with a reasonable amount of machinery. Consequently criticism is often unjust.

Acting largely on this theory, a number of power plants have been or are being installed in the Montreal River district, at South Lorrain, and Gowganda and Miller Lakes. In the Montreal River, the Mother Lode Otisse, Otisse Currie, North American Silver Mining Company, Moose Horn, Elk Lake Development Company, as well as others, have installed power plants. In South Lorrain the Keeley Mine has an elaborate gas producer plant, the Wettlaufer is installing a five-drill compressor, and other companies contemplate the erection of machinery. At Gowganda and Miller Lakes I know of eight plants that are being installed, ranging in capacity up to ten power drills. Elsewhere, as at Maple Mountain, are other plants. In fact, outside of Cobalt proper there must be thirty or more installations of machinery, costing from \$10,000 up. Many of the mining companies have provided supplies for several months' operation. The old policy of stopping as soon as silver is discovered and waiting for a buyer has been generally abandoned for one of energetic effort to ascertain the true nature and extent of the ore bodies. This must result in enormous increased development, and, in fact, already there are evidences of this probability. It would not be at all surprising if the Cobalt region and its outlying camps double last year's production during the present year.

## REPORT OF THE DEPARTMENT OF MINES, PROVINCE OF NOVA SCOTIA, 1908.

(Continued from last issue.)

### CUMBERLAND COUNTY.

**Eastern Coal Company, Limited.**—This company's collieries at Maccan have made good progress during the year. Mine development has been pushed. Sinking has been continued to a total depth of 1,132 feet from the surface. A nine-million gallon reservoir was among the additions to the surface plant. Bankhead, screens, picking belts, engine and other machinery are complete. **The Joggins Mines** belong to the same company. Noteworthy changes have taken place here. A new slope, 2,400 feet, has been driven, and a new bankhead completed within thirteen months.

The other coal mines of Cumberland County are the **Chignecto, Strathcona, Jubilee, and Fundy.**

**The Debert Mine**, Colchester County, has a small output. It is, however, being developed rapidly.

### PICTOU COUNTY.

**Acadia Coal Company.**—The **Allan Shafts**, Nos. 1 and No. 2, of this company have been connected and ventilation thereby improved. Endless haulage was installed for conveying coal from No. 2 shaft to the new bankhead at No. 1 shaft. **The Albion Mines, Acadia Colliery, and Vale Colliery**, all operated by the Acadia Coal Company, have shown much improvement. The mining practice at these collieries is modern and effective. Safety lamps used are of the Wolfe Patent Lighter type, with magnetic lock except at their Thorburn mine, where the Ackroyd-Best is soon to replace all other makes. Saxonite and Monobel are the explosives utilized.

**Intercolonial Coal Company, Westville.**—The **Drummond** collieries report a fair amount of develop-

ment. New seams have been discovered overlying the main seam south-west of Stellarton.

**Marsh Colliery, Coalburn.**—This mine shipped 35,033 tons of coal during the year. 65 men are employed underground.

### Accidents in Collieries.

Year ending September 30, 1908.

|                          | Fatal. | Non-Fatal. | Total. |
|--------------------------|--------|------------|--------|
| Cape Breton, South ..... | 14     | 126        | 140    |
| Cape Breton, North ..... | 6      | 20         | 26     |
| Cumberland County .....  | 4      | 3          | 7      |
| Pictou County .....      | 5      | 24         | 29     |
| Inverness District ..... | 13     | 10         | 23     |
| Totals .....             | 42     | 183        | 225    |

Total number of workmen under and above ground, 14,547.

Fatal accidents per thousand men employed under and above ground, 2.887.

Non-fatal accidents per thousand men employed under and above ground, 12.58.

Total coal produced, 6,299,282 tons.

Coal produced per fatal accident, 149,983 tons.

It may be remarked here that the reports of accidents are most unsatisfactorily arrayed. No general tabulation is given. There is merely a list of unclassified accidents for each district. It is certainly time that the department realized the absolute necessity of presenting clear analytical tables. The above statement has been prepared hastily from the lists in the Report. The special reports upon the Port Hood Explosion are not creditable documents.



**GOLD.**

During the year ending Sept. 30th, 1908, the production of gold in Nova Scotia fell to 11,990 ounces—8,016 ounces less than the previous year. This amount was recovered from 59,797 tons of ore crushed, representing an average of 4.02 dwts. from each ton treated. This yield per ton is practically identical with that of last year; but the total production is the smallest since 1881.

No serious accidents occurred during the year. Deputy Inspector Picking's remarks are as follows:—

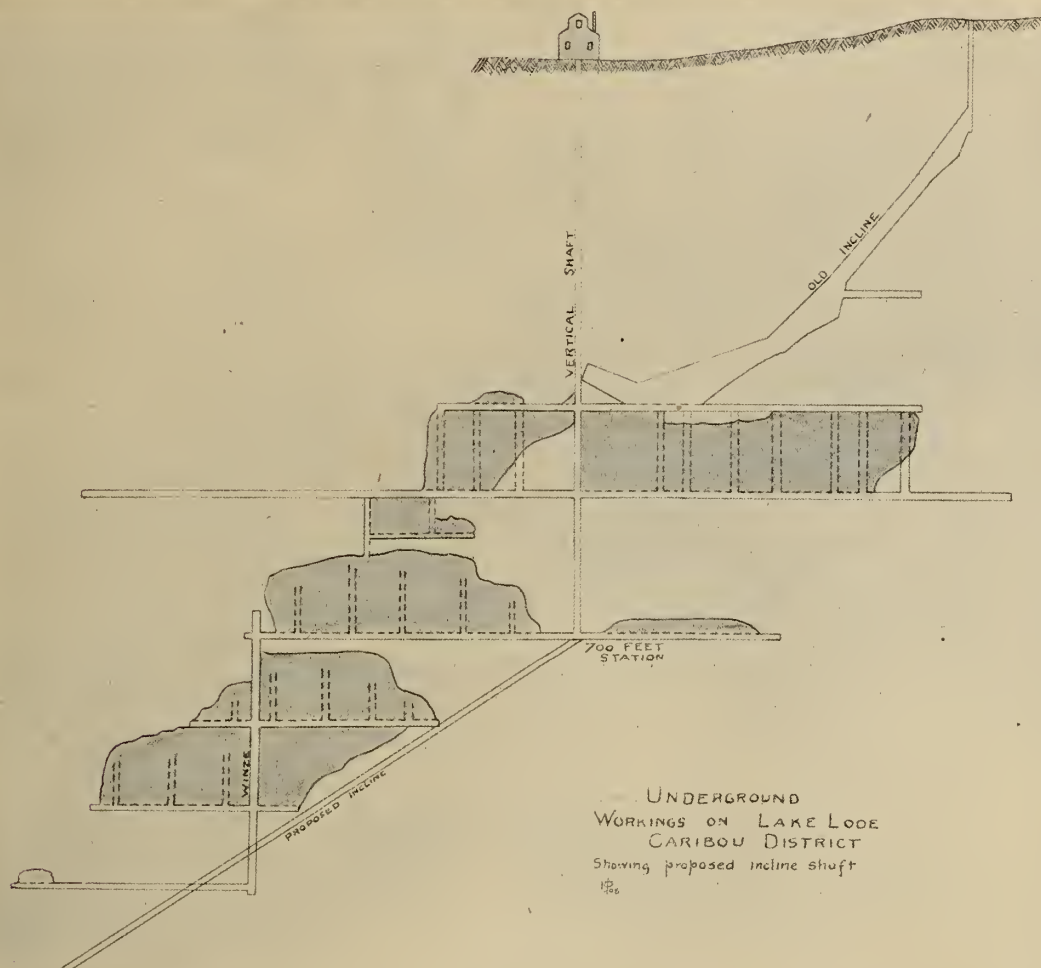
"Fourteen different companies were operating in the following districts: The Beaver Hat Gold Mining Co., at Lower Seal Harbour; the Boston Richardson Mining Co., at Goldboro; McDonald & Copeland (Mod-

ince, among which were County Harbor and Miller's Lake, in Guysboro County, West River, Sheet Harbor, Harrigan Cove, Lake Catcha, and Montague in Halifax County, Gold River, Lunenburg County, Rawdon and Uniake, in Hants Co.

"Exclusive of tributors and prospectors, the industry provided employment for 500 men; this being about the same number as during the previous year.

"At Caribou, Renfrew, Malaga, Gold River, and Middle River, development and construction work claimed the attention of the operators, and during the coming year a large increase in production should be received from these districts.

"At the Boston Richardson, although the mill and bromo cyanide plant were in almost continuous opera-



stock) at Forest Hill, all in Guysboro County; the Dominion Mining Co., at Tangier; the Caribou Gold Mines, at Caribou; the Consolidated Mines Co., of Canada, Ltd., and the Robert Kaulbach Mine, (Touquoy), at Moose River; the Oldham Sterling Mining Co., at Oldham, all in Halifax County; the Chester Basin Gold Syndicate at Gold River; the Mic-Mac Gold Mining Co., at Leipsigate, both in Lunenburg County; W. J. Prisk & Co., (Malaga Mining Co.), at Malaga Barrens; the Ophir Gold Mining Co., at Brookfield, both in Queen's County; the Eagle Mining Co., at Renfrew, Hants County; and The Great Bras D'Or Gold Mining Co., at Middle River, Inverness County, C.B. In addition to this, tribute work and prospecting was carried on at many of the other districts throughout the Prov-

tion, the larger portion of stuff milled was from the development work on the new incline shaft, and the 550 and 700 feet levels.

"The operations of the Great Bras D'Or Gold Mining Co., at Middle River, are of special interest, and the past year shows the first gold recovered in this district, or in fact in the island of Cape Breton, by stamp milling. The method of mining here, namely, tunneling into the base of the hill, and thereby doing away with hoisting and pumping, should enable the operators to supply the crusher with ore at an exceedingly low cost. At the Oldham-Sterling mine, the steady increase of values gotten from the Sterling barrel-lead as depth is attained, is very gratifying.

"Operations of the Boston Richardson Mining Co.,

were interrupted for a short period during the past year owing, it is said, to need of financial adjustment, after a very short delay the mine again resumed work with a fair prospect of business success.

"A feature in the operation of this company during the past two years has been the attention paid to arsenic extraction. Arsenic in greater or less quantities is found in nearly all of the gold bearing leads of the province, and the results obtained by the Boston Richardson Mining Co., should encourage other companies in the province to give the extraction of this mineral serious attention.

"The introduction of hammer drills into many of our mines should greatly reduce cost, especially in working narrow belts where the introduction of the hammer drills will enable the mines to be worked at a profit; where this was not possible when using the piston drill or the slower hand-steel. Two kinds of drills are at present in use in the province, namely, the Murphy, manufactured in Denver, and the Whitcomb, manufactured in Rochell, Illinois. At the Mic-Mac mine, before purchasing hammer-drills, competitive tests were carried on; the hammer drill competing against the piston drill. In one shift, with the hammer drill 106 feet were drilled and fired by one man. In actual drilling time, 2 hours, 35 minutes, 42 feet 6 inches were drilled, holes all uppers. These drills are now being used by the Mic-Mac Gold Mining Co., The Eagle Mining Co., The Chester-Basin Gold Syndicate, the Oldham Sterling Gold Company, and the Caribou Gold Mines.

"A most important discovery of tungsten in the form of scheelite was made at Moose River gold district, early in the summer: reference will be found to this in another page of this report. Although the gold production for the last year has been somewhat unsatisfactory, indications, at the end of the year, point to great activity and increased production during the year 1908-09."

#### TUNGSTEN.

The discovery and exploitation of the scheelite deposits near Moose River have been described already in the *Canadian Mining Journal*.

#### GOVERNMENT DRILLS.

The Government of Nova Scotia is liberal in its use of diamond and calyx drills. During the year five drills were kept in commission at a cost to the Department of \$4,690.40; 22 holes were bored, making a total footage of 7,905 feet 7 inches. This exceeds the previous year by 1,632 feet 6 inches, and constitutes a record for the Province. Costs were brought down satisfactorily. The figure given above is not total cost, as the Department only meets a part of the expense. Since the year 1900 the Department has expended \$65,372.92 in connection with these drills.

The average actual cost per foot for boring by all drills was \$1.06. The cost per foot for all boring by diamond drills was \$0.805, and by calyx drills, \$1.34. The carbon cost per foot in boring by diamond drills was \$0.077, and the shot cost per foot by calyx drills, \$0.056.

The report of Mr. Harry Piers, curator and librarian, on the Provincial Museum and Science Library, bring the volume to a close. Mr. Piers, who was in charge of the Nova Scotia mineral exhibit at the last Canadian National Exhibition, reports 117 accessions

to the Museum, and the addition of 3,761 pamphlets and books to the library.

Appended to the Annual Report are statistical tables.

#### COMPOSITION OF THE APLITES.

Written for The Canadian Mining Journal.

In view of the ever-increasing interest in the aplite of Northern Ontario, it was thought that the following results of chemical analyses of some of these, made by the writer, might be of interest to some of your readers

|                                | I.    | II.    | III.   |
|--------------------------------|-------|--------|--------|
| SiO <sub>2</sub>               | 78.28 | 58.84  | 72.33  |
| Al <sub>2</sub> O <sub>3</sub> | 12.00 | 11.24  | 12.99  |
| Fe <sub>2</sub> O <sub>3</sub> | ....  | ....   | none   |
| FeO                            | 1.19  | .475   | 2.50   |
| MgO                            | .37   | .35    | .97    |
| CaO                            | .29   | 12.17  | 1.73   |
| Na <sub>2</sub> O              | 6.89  | 6.91   | 7.60   |
| K <sub>2</sub> O               | none  | .07    | none   |
| H <sub>2</sub> O               | .61   | .40    | 1.09   |
| TiO <sub>2</sub>               | .34   | .26    | .74    |
| CO <sub>2</sub>                | none  | 9.84   | 1.00   |
| BaO                            | ....  | none   | ....   |
| S                              | ....  | .13    | ....   |
|                                | 99.97 | 100.68 | 100.95 |

I.—Typical, fine-grained, pink aplite, in which no calcite could be detected, from Foster Claim, James Township.

II.—Typical, fine-grained pink aplite, showing considerable calcite, from 444 James Township.

III.—Grey, medium-grained granite, with a little calcite, from the dike cutting diabase on the University property, Cobalt.

Under the microscope all three show mainly acid plagioclase and quartz with a little titanite and chlorite, and in II. and III. some calcite.

The analyses show that the acid plagioclase is necessarily albite. The proportion of the mineral constituents of each is therefore easily calculated and shows:

|          | I.   | II.   | III.  |
|----------|------|-------|-------|
| Albite   | 58.4 | 59.0  | 64.4  |
| Quartz   | 36.8 | 16.7  | 26.8  |
| Titanite | .8   | .6    | 1.8   |
| Chlorite | 3.7  | 1.6   | 4.9   |
| Calcite  | 0.0  | 22.4  | 2.2   |
|          | 99.7 | 100.3 | 100.1 |

The table brings out clearly the simple mineral composition of the aplites, concerning which there has been some diversity of opinion. It also emphasizes the similarity of the granite dike on the University property, Cobalt, to the aplites of the Montreal River area.

N. L. BOWEN,  
Geol. Labs.,  
School of Mining, Kingston.

#### GOLD IN APLITE.

In Dr. Malcolm MacLaren's book, "Gold," an interesting occurrence of that metal in aplite is described. Overlying the Archean rocks in some regions of British Guiana, South America, is a great development of unfossiliferous sandstone and conglomerate of unknown



age. Both the Archean rocks and the sandstones are penetrated by dykes and sills of diabase. In places the diabase appears to have been developed as laccoliths. Elsewhere it has flowed over the Archean rocks.

Gold is found widely diffused in the districts occupied by the Archean rocks, but only in payable quantities where certain conditions prevail. Chief of these conditions appears to be the intrusion of basic igneous rocks, which are of two periods. The earlier belong to the gneissose formation, and were probably originally gabbro and diabase, but are now converted to quartz-diorite, epidiorite, amphibolite, and hornblende-schist; while the later igneous rock is an unaltered diabase.

In the former type of rocks, gold appears to be diffused through the mass, and is set free during its weathering and degradation in sufficient quantity to form economically valuable placers.

When the Archean rocks are traversed by dykes of the later diabase, gold is not infrequently found in the decomposition products, especially in the vicinity of the junction of gneiss and diabase. The gold deposits occur most frequently where the dykes of diabase are small and numerous.

A third source of gold, at times of economic importance, is in highly mineralized acid rocks, such as the aplite of Omai. In many places there occur negmatite veins that gradually pass into quartz veins in lateral extension, but these are almost always barren.

The surface rock at Omai is a diabase which is associated with aplite and granitite. Borings to the depth of 964 ft. revealed epidiorite. The Archean rocks of the country are apparently intruded by the mass or stock of aplite granite. After its intrusion there was a succession of outbursts of diabase, and the latter rock is now developed both above and below the aplite. The interest of the occurrence lies in the fact that the aplite is gold-bearing, selected specimens assaying as high as 15 dwts. per ton. The aplite carries at depth a great deal of pyrites, and the gold found is probably associated with that mineral. Small quartz veins, which are exceedingly numerous in the aplite, are slightly auriferous. Most of the gold is obtained by suicing the highly decomposed aplite.

### THE SONG OF THE OIL-WELL DRILLER.

By John Ravenor Bullen.

In that fascinating region where a bark-stripped grey-white legion

Of three-legged ugly derricks streak the sky,  
'Mid the rustle and the hustle of a breath-destroying bustle.

There, for many thrilling years existed I.

Could I give the faintest notion of the crashin' mad commotion

Of a drillin' rig that's reelin' off a "run,"

When the engine gets agoin' and the damned old boiler's blowin',

You would own there's nothing like it 'neath the sun.

When the walkin' beam's abangin' with a demon-devil clangin'

And the rig just settles down into her stride,  
Why you yellow-bellied quitter, you uneducated critter,  
She 'ud make you fairly jump from out your hide.

"Fire the boiler till you bust 'er, bring in well or bring in duster,

We'll jolt 'er down a fifty foot to-day,  
Man alive, screw on that sinker—Good God, Bill, hook out that clinker!

Jumpin' Jordan! pull the wrench block out the way.

"Move them legs you pig's-foot bladder, leap it up that scaffold ladder,

Or I'll use this broncho-bustin' boot o' mine,  
Lock your lips in on that drivell, flap a motion on that swivel,

And we'll jerk the blinkin' sand-pump into line.

"There she goes—ker-plink'ker-sploser, swishle bur-rur-rur-rur swosher,

Brake 'er! brake 'er! there she sits, 'four-sixty-eight,'

Plup—kerthropper—throp—kerthropper, yank 'er out she's packed in proper,

Now lets see the latest 'cuttin's'-up to date.

"Up she comes arearin', rippin', beat my block, she's fairly drippin'

With the oozy genuine—or I'm a liar,  
Hear the rocked-in gas a-gnawin' at the walls just like the roarin'

Of a bunch o' snortin' engines at a fire.

"Glory boys, here comes the shooter, 30 quarts just ought to suit 'er,

Let 'em down and blow 'er guts up to the light,  
Crack!—thud! 3—5—7—ten—now, keep your—what did—if—it—when—how!

Swish—swish!—God!—it beats a rocket in the night!

"Hallelujah! boys, she's flowin', bubblin', bellowin' an' blowin'

Like a grampus!—hip, pip, pip, pip, pip, hooray!  
Did some oyster whisper duster? she's a regler blue-jean buster,

Pump a barrel? pump a hundred every day!"

Yes, there's something that will never cease a-calling me—for ever,

I might reason out the wherefore and the why,  
But it's in that wondrous region where a bark-stripped grey-white legion

Of three-legged ugly derricks streak the sky.

Toronto, March 17th, 1909.



## BOOK REVIEWS.

**Millwrighting.** By James F. Hobart. 140 Illustrations, 401 pages. \$3.00 net, postpaid. Hill Publishing Company, 505 Pearl St., New York, 1909.

In the set phrase of the reviewer this book "fills a long-felt need." "Millwrighting" gives a comprehensive view of a subject on the details of which many mining engineers are weak. Beginning with a definition of a millwright the location, foundation, erection and roofing of mill buildings, are described. Much practical advice goes along with the description. Installation of machinery, laying out shafting, putting pulleys in place, belts and belting, setting up machines, babbitting, pipe fitting, etc., are succinctly set forth. Moreover the engineering phases of millwrighting are by no means neglected. Such topics as strength of materials, factors of safety, snow and wind loads, roof trusses, are given proper attention.

Readers of Hobart's volume will be particularly impressed with the wealth of useful hints to be found throughout its chapters. We notice, for instance, that in Chapter XIX two pages are occupied with a description of the preparation and use of glue in the construction of wood pulleys. Similarly, most useful instructions are given concerning shop work.

"Millwrighting" can justly be placed in the category of useful and necessary books. In new districts, where the operator has not the example of neighbors to guide him, it will be found particularly handy.

## EXCHANGES.

**The Mining World, March 27, 1909.**—Our contemporary of this date comments in its editorial columns upon methods employed in dealings on the curb market. The curb is, apparently, attempting to regulate the listing of market shares. The Mining World declares that a mining stock should be thoroughly investigated and that the mine itself should be examined by a mining engineer "who should be employed by the curb organization at a regular salary provided by a small monthly tax on the members."

**The Engineering and Mining Journal, March 27, 1909.**—An editorial on "Coal Mining as an Investment" in this number concludes thus: "For the man whose judgment is sound and vision is keen, coal mining offers attractive opportunities. The cry of over-production is not more serious now than it was in 1902, and along with improved methods of mining, that not only insure cheaper production but also a greater percentage of recovery, the prices paid per ton at the mines are higher now than in 1902. It is to be admitted that labor and material now cost more, but the slight increase in them is offset by the advance in the art of mining, which now enables a recovery of 90 per cent. or more as compared with 70 or 80 per cent. a few years ago."

**Mines and Minerals, April, 1909.**—Mr. Francis Donaldson writes on "Modern Shaft Sinking" in April Mines and Minerals. He refers particularly to the time limit and penalty set in sinking shafts by contract. The usual time limit provision reads: "and in the event of the contractor failing to complete the work by this date, it is mutually agreed that he shall pay the contractor the sum of — dollars for every day thereafter until the work is completed, not as a penalty, but as liquidated damages." In spite of this definition the

courts have often held that the actual damages must be proven, and the possibility of collecting the stated damages is not assured. . . . "The writer therefore believes that where a penalty is to be collected for delay, an equal premium should be paid for time saved, not only because this is fair but also because it is likely to expedite the work."

**The Mining Journal (London), March 20, 1909.**

—A remarkable letter appears in this issue of The Mining Journal. A correspondent writing from Ambositra Madagascar, states that Messrs. Mortgage & Grillon's claims, although worked by very primitive methods, have yielded 233 kilogrammes of gold in less than a fortnight. Since July 1907, it is averred, the output from these claims has reached considerably over two tons of gold. The soft and partly decomposed quartz is collected by the natives crushed between two stones and the residue panned. In this way 20 to 30 per cent. of the gold is saved. From a locality near Ambositra, the writer claims to have seen a piece of mica schist, weighing about 5 lbs., being crushed by native women with small wooden sticks and then panned. The gold obtained was a little over an ounce. The tailings showed that over 70 per cent. of the gold was lost.

## PERSONAL AND GENERAL.

Dr. A. E. Barlow has been ill for some days at his residence in Montreal.

Mr. John A. Macdonald, manager of the Foster Mine, Cobalt, was in Toronto on the 7th inst.

The Hon. Mr. Cushing, Minister of Public Works, Alberta, was in Toronto on April 2nd.

Mr. James Conmee has been appointed chairman of the Commons Committee of Mines and Minerals.

Mr. Albert Scott, well known in Temagami and Cobalt, has accepted a position with the Lake Superior Corporation.

Mr. W. H. Aldridge, manager of the Consolidated Mining & Smelting Co., has been in Montreal in company business.

Mr. Martin Cohn, managing director of the German Development Company, is residing temporarily at 53 Elm Avenue, Toronto, Ont.

Mr. R. L. Broadbent, of the Canadian Geological Survey, is on a trip through the Boundary and Kootenay districts of British Columbia.

Mr. W. A. Carlyle, consulting engineer of the Le Roi Mining Co., is in London interviewing the directors regarding the future development of the Le Roi.

Mr. Norman Fraser, late Chief Inspector of Mines for Alberta, has resigned that position to become superintendent of the Crow's Nest Pass Coal Co.'s Michel collieries.

Mr. E. A. Holbrook, superintendent of the Daly Reduction Company's mill and cyanide plant at Hedley, B.C., has returned from a two months' trip to Massachusetts.

Mr. Fritz Cirkel, M.E., of Montreal, has been retained by a firm of Philadelphia bankers to report on the consolidation of the "King Bros.," "British-Canadian," "Beaver," "Standard" and "Dominion" asbestos mines in the Eastern Townships of Quebec.



## CORRESPONDENCE.

## GOLD MINING IN NOVA SCOTIA.

The Editor:

Sir,—The mention of my name and the incorrect version of my opinions made in the course of a debate in the House of Assembly of the Nova Scotian Legislature renders it proper for me to proffer an explanation and a protest at this time. As the Canadian Mining Journal is the spokesman for the mineral industry of the Dominion, I venture to trespass on your courtesy.

You will be aware that in 1905, at the urgent request of a committee of the Mining Society of Nova Scotia, acting by agreement with the Premier of the Province, I was asked to examine and report upon the gold deposits of Nova Scotia with a view to offering suggestions for successful exploitation and investment of capital. At the time this happened, I was editor of a mining journal, so I declined, suggesting the names of several men better qualified for the task. When, however, I resigned the editorship, I was asked again to undertake the work, it being emphasized that my knowledge of the saddle reefs at Bendigo fitted me to investigate the similar occurrences in Nova Scotia. I agreed to make a preliminary visit, without a fee, it being understood that if the conditions seemed to me to warrant a geological investigation, I would return at a later date and spend a month or more in gathering data. Thus in July, I went to Halifax and in August I returned thither, having accepted the retainer of the Government. The various gold-mining districts were visited and carefully examined, with the assistance of Messrs. Faribault and Weatherbe. No man ever had more capable assistance. Mr. E. R. Faribault is the geological surveyor whose maps constitute the pride of Nova Scotian geology; he is an earnest worker and an energetic observer; if we disagreed, it was not surprising; for to him an ore deposit is a fascinating natural occurrence rather than an economic entity. We disagreed, as scientific geologists and mining engineers are privileged to disagree. I found him optimistic beyond the warrant of facts; doubtless he regarded me as erring the other way. However, he aided me loyally. For Mr. D'Arcy Weatherbe I need scarcely speak; he has become a close personal friend and by his subsequent career he has proved that any high estimate of his character formed by me in 1905 has been more than fulfilled by 1909. Mr. Weatherbe has shown himself to be qualified for positions much more important than that of Assistant Inspector of Mines in Nova Scotia. Thus my work was lightened by cordial assistance, and in September, I returned to New York.

Early in January, 1906, the report was transmitted to Halifax. It has never been published, simply because I took a gloomy view of the future of gold mining in Nova Scotia, more particularly as regards the investment of capital on a large scale. The concluding paragraph of the letter accompanying my report states:

"The conclusion which I formed from the sifting of all the evidence obtained, is that there is a geologic similarity to Bendigo, as regards the form of the gold-bearing quartz, for in both cases the miner has encountered 'saddle reefs' or anticlines of quartz; but there are differences so great between the two districts as to destroy the economic value of the structural likeness. The occurrence of ore capable of yielding a reasonable profit, say, a stoping width of 6 or 8 dwt. per ton, is so scanty in Nova Scotia as to render invidious the com-

parison with Bendigo; and, as far as is known, there is no justifiable expectation of such persistence of good ore in depth within the northern goldfield as in that of the Antipodes. Gold mining on a large scale has rarely proved profitable in Nova Scotia, and the likelihood of developing such enterprises has been decreased by the developments of recent years, because these have indicated the improbability of a repetition of ore-shoots in the underlying quartz formations. By ore I mean gold-bearing quartz from which, under existing conditions, a profit can be won. On the other hand, it is my opinion that mining operations on a small scale, carried out by working miners, without the investment of large sums of money either in equipment or exploration, but based upon local knowledge and skilful prospecting, are likely to prove remunerative.

"I do not endorse the attempts made (chiefly by those who spend large amounts of money lavishly, and too often improvidently, in undertakings not founded on careful preliminary investigation) to belittle the local syndicates and parties of lessees who have found and worked most of the profitable mines of Nova Scotia, and I advise that the policy of the Department be so shaped as to encourage this form of domestic enterprise. It is upon such that the future of gold mining in Nova Scotia must depend, as it has done, for the most part, in the past."

The plain fact is that I performed the duty for which I was engaged without delay and in good faith; the Government paid me for advice; I gave it plainly and frankly, as a physician who after a careful diagnosis finds his patient moribund.

The report was pigeon-holed. Then began a farce, the humor of which I appreciated until it was overdone. In the records of the Mining Society of Nova Scotia and elsewhere will be found excuses and explanations for the failure to publish my report. First, it was said that the report was not completed; next, that it had been delayed by the San Francisco disaster; then, that the Minister of Mines had written to me for further advice or information; then that it was unsatisfactory; finally, that it was pessimistic. On writing to Mr. A. A. Hayward, the President of the Mining Society, I was informed that my opinions were fallible, to which I could not but agree. Thus, I was placed in a false position by the lack of frankness displayed by my friends at Halifax, namely, Messrs. Murray, Hayward, Woodman, and others.

On March 15, before the House of Assembly, Mr. Wilcox stated that only an average of 89 men had been employed by the gold mining industry of Nova Scotia in 1908, as compared to an average of 292 in 1905. He added that last year the gold yield has been the smallest since 1881. Thereupon he quoted various authorities who have written on the subject of gold mining in Nova Scotia, and, among others, one who stated that "gold was not a surface metal, but must be followed to the depths to develop it with any degree of success." This sophomoric rubbish was quoted because it was optimistic. Emphasis was also placed on the fact that the Province had won a gold medal at Toronto for an exhibit of gold specimens; as if specimens bore any relation to mines. Mr. Wilcox did not refer to my report, and for that I am grateful. But Mr. Murray, the Premier, referred to it subsequently and so often that he might have saved time by reading the report



itself to his fellow legislators. Instead, he quoted me inaccurately; in fact, in a most misleading manner. While I am aware that such misquoting was inadvertent, it is inexcusable. The Government paid me a handsome fee to prepare a report for the use of those engaged in gold mining in Nova Scotia; are we to infer that only sugar-coated optimistic opinions have any value? I reported for the Government as I would for any other client, frankly, straightforwardly, without circumlocution. They wanted to know; I tried to tell them as best I could. That is all. Why, therefore, this hocuspocus and dodging? I have kept silent for three years; it seems proper to make the facts known.

Yours faithfully,

T. A. RICKARD.

San Francisco, March 25, 1909.

April 2nd, 1908.

To the Editor Canadian Mining Journal:

Sir,—In your issue of March 15 there is a letter from Dr. Coleman in which he criticizes my retention of the old classification of our Ontario clays, and states that in the light of modern geology these old classes, Erie, Saugeen, etc., are no longer useful. In the first place, I would point out that my article was intended as a practical one for clay-users, a class of people who lack the geological training necessary to make fine distinctions. Further, I submit that any classification of anything to be "useful" must be practical, and Dr. Coleman's suggestion that the Erie clay should be called by a number of names according to the various extinct glacial lakes in which it was laid—is decidedly impractical, except to a highly trained geologist.

I realize as fully as does Dr. Coleman that "The so-called Erie clay was laid down partly as boulder clay and partly in several glacial lakes." And as evidence of that I would cite my report on "Clay and the Clay Industry of Ontario," B. of M. Report, 1906, p. 10, which reads as follows: "The Erie clay represents local deposits of boulder clay, which are often so free from stones and gravel, and so largely made up of clay, that it can be used in the manufacture of clay products." Again on p. 11 of the same report I repeat, "The Erie clay then, appears to be only the cleaner localized accumulations of the boulder clay, and was probably formed in the presence of much more water than was the typical boulder clay."

The deposition of the Erie blue clay was one continuous process whether at one place as boulder clay or at another as more sorted material in a glacial lake; and the clay, or really rock-flour, is quite uniform in its chemical, physical, stratigraphical and economic characters, as shown by a description of it in every county in Ontario west of Brockville. Why then should we give up the old and simple term Erie "blue-clay," known to everybody, for a series of obscure names, such as Warren, Algonquin, Iroquois, etc., based on the various extinct glacial lakes in which this clay was deposited? If these clays differed from each other there would be justification in the suggestion, but when these various bodies of clay would only be distinguishable on topographic evidence, an evidence that very few people could apply, it seems more serviceable, and, therefore, "useful" to retain the old name Erie clay.

Regarding the Saugeen clay, he stated that this term is no longer useful, as this clay is not a separate clay from the Erie. He then adds: "It is often only the shallow water accumulation, near the edge of a

glacial lake, and connects up with blue Erie clay laid down in deeper waters of the same lake." Then he states further: "In other cases it is simply weathered Erie clay from which the lime has been leached." This is surely strange. The first theory gives a genetic origin to this clay, as being contemporaneous with the Erie, while the second theory states that it is of secondary origin and resulted from weathering in place, of a previously existing clay. How can both of these be true?

The first theory is not essentially different from mine, which is that this thinly laminated Saugeen clay, composed of alternate bands of clay and sand, an evidence of shallow water, was deposited about the edge of the slowly retreating ice-sheet in its later stages. This theory, I submit, is the more reasonable when we see this clay extending from Kenora, Dryden, Fort William, Sault Ste. Marie, Webbwood, North Bay, Pembroke, Casselman to the St. Lawrence River; and from this line northward as far as any of our Ontario survey parties have reported on the clays. I have seen it myself from Bracebridge to a point one hundred miles north of Lake Abitibi, making a total cross section from south to north of at least 400 miles. It does not seem reasonable to call this enormous area "Only the shallow water deposit near the edge of a glacial lake."

As for his second theory, "That the Saugeen clay is only the weathered top of the Erie, etc.," I claim it is entirely untenable. There is a red-burning clay in Western Ontario, which is only the weathered top of the Erie clay, from which the lime has been hached, and for want of a better name I have called it the Red Top clay, but it is not for a moment to be confused with the Saugeen clay. The Saugeen clay is usually underlain by a layer of sand or gravel two feet or more in thickness, which separates it from the underlying formations. This layer of sand and gravel is the evidence of a break in the character of the deposition at that place, i.e., it is the evidence of a nonconformity. As long ago as 1863 Dr. Dawson recognized this point when he said in *Geology of Canada*, 1863, page 896: "Two divisions have already been indicated in the stratified clays of Western Ontario, the lower of which was partially worn away before the deposition of the upper division, so that this rests unconformably upon it, adapting itself to the irregularities of the denuded surface. The latter is sometimes associated with beds of sand or gravel, a layer of which belonging to the upper division sometimes marks the contact with the underlying deposit. The upper division of these deposits, which is well exposed along the Saugeen River, may be called the Saugeen clay." On the other hand, as late as 1907-8, Messrs. Fritz Cirkel and J. J. Bell, reporting on Ontario for the Department of Mines at Ottawa, state in the *Mining and Metallurgical Industries of Canada*, page 749, in describing clay deposits at Casselman: "This yard contains about 10 acres of clay, with an unlimited supply on adjoining properties, blue below, red above, with a layer of sand on top. The sand and red-clay (Saugeen) are mixed for red brick. The blue clay (Leda) is too strong for brick making." Again in describing Mr. Pilon's yard—on the same page, they write: "There is an unlimited supply of clay which is formed in alternate layers of red and white (Saugeen), with sand between, in all about 12 feet, with blue clay (Leda) below." In view of these statements and my own confirmation from personal observation throughout Ontario, I still maintain that the Saugeen is a very characteristic and distinct clay, and the retention of the name Saugeen is not only useful, but desirable. I would



suggest that possibly Dr. Coleman has not distinguished between this characteristically laminated Saugeen clay and the weathered top of the Erie clay, which I have named Red Top. There is no possible confusion of these two clays.

My statement that the Leda clay in the East is contemporaneous in age with the Erie clay in the West, I admit is incorrect. My idea was that the Leda clay was contemporaneous with the later deposits of Erie clay, and I drew this inference from the concluding paragraphs of Dr. Coleman's valuable paper on Iroquois Lake—B. of M. Report, 1904. In his conclusions on page 243 we find the following: "The succession of events in the retreat of the last ice-sheet may be summed up as follows: (1) Retreat of the ice-front to the Oak ridges moraine set free the basin of Lake Ontario and drained off Lake Warren; but the St. Lawrence Valley from Havelock to Watertown, in New York State, was still blocked with ice so that the overflow from Lake Algonquin, occupying the basins of the three upper lakes, was impounded as Lake Iroquois which had an outlet past Rome, N.Y., into the Hudson."

(4) The partial or total disappearance of the ice dam left the St. Lawrence channel 330 feet or more lower than at present, and at a level with the sea, but the influx of fresh water from the upper lakes, and the narrowness of the strait near Brockville, kept the water fresh, so that marine animals went no further west than Brockville."

"As the ice abandoned the region of the Ottawa and St. Lawrence Valleys, and the low land lying between, the sea followed up its edge, etc. Though the water of the Ontario basin stood at sea level, it was apparently kept fresh by the rivers which flowed into it, especially Niagara."

From these paragraphs, as conclusions to Dr. Coleman's report, I inferred that fresh water Erie clay was still depositing in Iroquois and Algonquin Lakes, while marine Leda clay was depositing in the salt waters east of Brockville, and it was in this sense that I considered these two clays contemporaneous.

Yours truly,  
M. B. BAKER.

Geol. Dept., School of Mining, Kingston.

The Editor the Canadian Mining Journal:

Dear Sir,—In your issue of February 15th you published an interesting article by R. E. and A. R. Chambers, entitled, "Sinking of Wabana Submarine Slopes," splendidly illustrated and very interesting from a practical standpoint.

In this connection, however, I would like to discuss the paragraph on page 113 entitled "Testing Air Pipes." The paragraph is as follows: "All pipe ends are carefully closed as near to the drills as possible. A pressure gauge is connected to the section to be tested. The section is then filled from the mains and the supply valve closed. The air in the line is then released until the gauge reads 50 lbs. The time is taken and the pressure allowed to drop by leakage until it reaches 40 lbs. when the time is taken. The loss in cubic feet of free air will be approximately half the volume of the pipe tested. This divided by the time will give the loss per minute."

It seems to me that if the same procedure were carried through and the pressure allowed to drop to 42.65 lbs. the result would have been more accurate, since  $50 - 42.65 = 7.35$  lbs. = half the atmospheric pres-

sure. In other words, by allowing the pressure to drop  $\frac{1}{2}$  the atmospheric pressure, the amount or volume of free air lost by leakage would be half the volume of the pipe tested.

Why then should the pressure be allowed to drop  $10 - 7.35$   
to 40 lbs. entailing an apparent error of  $\frac{7.35}{10 - 7.35} \times 100 =$

36.05%, which seems hardly approximate as stated, especially when it is just as convenient to allow the pressure to drop to 42.65 lbs.?

Yours sincerely,

GERALD DOBBS.

Box 97, Bessemer, Alabama, U.S.A.

To the Editor of Canadian Mining Journal.

Dear Sir,—My attention was called to a letter in your issue of April 1st by "Reader."

This is a criticism of an article of mine in the mining Journal, London, of February 6th.

For your correspondent's information I might say the first article "Impressions of Cobalt," appeared in the issue of January 23rd. This was the first of a series, written at intervals, two of which have been published, the third, after five months' observation, is now with the publishers. These observations being continuous from October last to date, possibly now justify an "opinion"—formerly merely "impressions" were needed.

I fail to perceive what is the particular object of your correspondent's criticism or why, if the article in question appeared in the London Mining Journal, a criticism in the Canadian Journal would either be intelligible to the majority of your readers or fair to the writer.

It is regrettable that the last clause should have been indulged in, as reputable mining men do not so characterize technical writing however such differs from their own opinion.

It would have shown better taste had your correspondent signed his name. Personal criticism under an assumed name is not in accord with professional etiquette.

Yours truly,

H. E. WEST.

Cobalt, April, 1909.

April 3rd, 1909.

The Canadian Mining Journal,  
Confederation Life Building,  
Toronto, Ont.

Gentlemen,—In your issue of March 15th, page 186, you have a small paragraph regarding the Quaker City-Cobalt Mines, Limited, in which you state that there are a force of twenty men at work. The number of men at work should read seven instead of twenty. We appreciate your kindness in inserting the reading notice but as we are very desirous of having only facts appear in print, or elsewhere, we take the liberty of calling your attention to the error.

Again thanking you for the notice, we beg to remain,

Very truly yours,

Quaker City-Cobalt Mines, Limited,

Per J. M. Ford,

Vice-President and General Manager.

Haileybury, Ont.

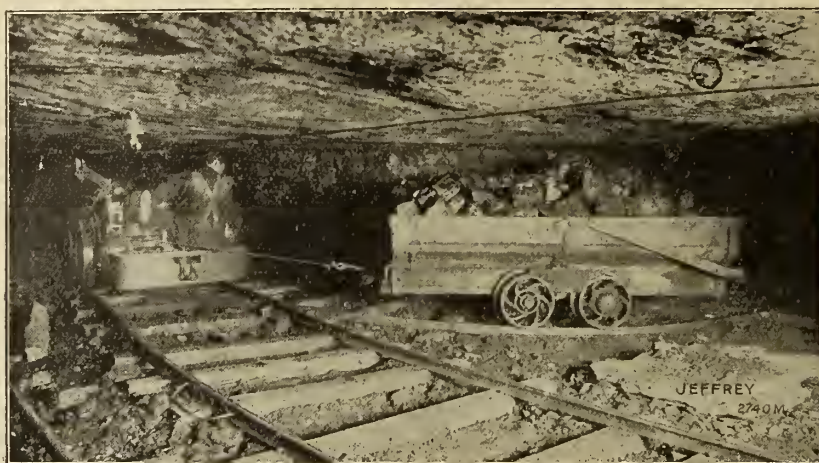


## INDUSTRIAL PAGE.

**THE JEFFREY CRAB LOCOMOTIVE.**

The Jeffrey Manufacturing Company, Columbus, Ohio, has recently added to its line of electric mine-locomotives a new type of gatherer, known as the Jeffrey Crab locomotive. The gathering locomotive commonly used is provided with a reel of flexible insulated conductor, which enables it to enter rooms for the purpose of delivering empty mine-cars; to the work-

There are several methods of operating this locomotive to advantage, choice depending upon the system of mining followed where the locomotive is used. With the double-entry system, the locomotive usually hauls a trip of empty cars into one entry and drops them off where they are required. Returning on the other entry, it stops in front of each room where a loaded car is ready. The trip-rider then drags the cable into the

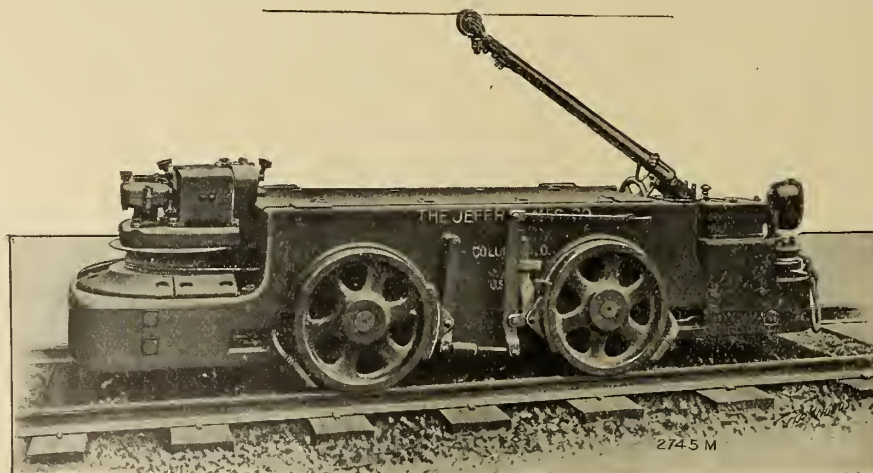


Jeffrey Crab Locomotive pulling car from room.

ing place and for hauling out the loaded cars. When the rooms are driven to the dip on steep grades, however, it is difficult for a locomotive which has to enter the room to work efficiently against the grade. When tracks are practically level and the cars not heavy it is found economical to push empty cars into rooms by hand, so that mechanical means are required only for hauling out loaded cars.

The advantages of employing a locomotive capable

room, attaches it to the car and signals the motorman, who starts the crab motor and pulls the car out to the entry track. The locomotive then either pulls it to the next room or leaves it standing until as many cars have been drawn from the rooms as are required to make up a trip. Then it pushes them together, and they are coupled up and hauled to the partings. On the return trip the empty cars are distributed in the entry from which the loads have been removed, and the locomotive



Jeffrey 5-ton Crab Locomotive, showing Crab device on which the haulage cable is wound.

of pulling out loaded cars without entering the rooms prompted the Jeffrey Manufacturing Company to bring out this crab locomotive, which was so named from a small winding drum, or crab, which is mounted on the forward end of the locomotive. Three hundred and fifty feet of  $\frac{3}{8}$ " flexible wire-cable wound on this crab is used for pulling the loaded cars from the rooms and to the entry tracks.

gathers the loaded cars from the entry which was supplied with empties on the preceding trip.

Where the single entry system is employed, the locomotive usually runs in with a train of empties. Stopping successively in front of the rooms in which loaded cars are ready, it hauls each car to the entry-track and pushed it ahead to the next room, dropping off an empty to replace each loaded car taken on. When all empties



have been distributed it proceeds to the parting with the loads gathered. By each of these methods a locomotive can gather from 75 to 200 cars per day, depending upon local conditions.

The crab device is made as compact as possible to avoid crowding the rest of the locomotive equipment. It consists of a cast-iron drum upon which a steel cable is wound. This is mounted on a vertical axis contained in a frame, the top of which supports the motor, which is connected by suitable gearing and a friction-clutch to the drum. The motor drives this gearing through a worm and worm-wheels, so that when it stops the gearing is locked against further motion. The drum is driven by the gearing by a friction-clutch, which acts not only as a smooth starting device for the cars, but also as a safety device in case a car becomes derailed or the motorman fails to throw off power until the car bumpers strike those of the locomotive. Without this friction arrangement the cable would break, in such cases or serious injury result to the gearing or to the motor itself.

The motor which actuates the crab, being entirely separate from the locomotive motors, is controlled by a separate starting box, and when the car approaches the entry tracks the motorman starts the locomotive ahead. As it advances past the switch points the car follows, and runs out upon the entry tracks without either the locomotive or the winding of the crab being stopped.

The crab may be stopped when the car strikes the locomotive; but the locomotive need not stop until the room is reached from which the next load is to be hauled. Then the trip-rider uncouples the cable and drags it into that room for the car. The arrangement is such that the cable may be paid out from either end of the locomotive. Ordinarily, it is more convenient to take the cable out past the motorman, as the end of the locomotive is then opposite the room-mouth and the motorman can watch the light carried by the trip-rider and see him signal to start winding. He can also watch the car to better advantage as it takes the switch, and can step instantly if it should become derailed. One great advantage claimed for the crab locomotive is that, it may replace animal haulage without making changes in the tracks or conditions in the working rooms of the mine.

At recent tests on concentration made by the Behrend Concentrators, Limited, at its plant, 48 Inspector St., Montreal, remarkable results were obtained from ores generally known as difficult concentrating ores.

On a run of chalcopryite from the Massey Mines, a saving of over 95% was made.

On 3% graphite, over 90%.

On 20% graphite, a saving of 92%.

On Cobalt slimes, over 97%.

The Behrend system is composed of the dry table for meshes from 10 to 80, and from 80 to and including slimes, a wet system is used. The dry fines are fed on moving water, the gangue and granulated mineral sinking, while the float mineral is carried to a filtering tank. The gangue and granulations are drawn off by spigots and fed to the head of a wet table, 6 inches wide by 12 feet long. This table is a sluice box containing six separate concentrating tables, the mineral bedding on each table and is continually drawn off. At the foot of each table or compartment, is placed a ducker, thus giving all solid matter a thorough wetting before it reaches the next table.

#### Concentration of Lead, Zinc, Copper, Tin and Iron Ores.

Bulletin No. 1437, January 1909. Allis-Chalmers Company, Milwaukee, Wis., U.S.A.

The catalogues of this firm are always of interest. Opening with a few general notes of definition this bulletin then covers the field of mechanical equipment for concentration, grizzlies, breakers, rolls, elevators, screens, jigs, separators and classifiers, pulp extractors, Huntington and Chilian mills, Overstrom tables, suspended and Frue vanners, spiral sand pumps, are taken up in the order given. To make the pamphlet logically complete two flows sheets of concentrating plants are appended.

The Brown Machine Co., Ltd., of New Glasgow, N.S. has been incorporated with a capital of \$100,000. This concern are manufacturers of mining and other machinery and dealers in mining supplies. It is their intention to build new and larger shops and to increase their output of coal mining equipment.

Recently orders for Analytical balances with the Ainsworth Improved Multiple Rider Carrier have been received by Wm. Ainsworth & Sons, Denver, Colorado, U.S.A., from the United States Food Inspection Laboratory, Denver, Colo.; the United States Mint, San Francisco, Calif., and the Watertown Arsenal, Watertown, Mass.

## NEW MINING AND METALLURGICAL PATENTS.

### No. 115,344. Rock Drill.

The Ingersoll-Rand Company, New York City, assignee of William Prellwitz, Easton, Pennsylvania, U.S.A., 1st December, 1908; 6 years. Filed 29th June, 1908. Receipt No. 160,204.

Claim.—1. A cylinder, a front head, a hollow drill steel, a water feed chamber, a separate air supply chamber, and reciprocating drill piston having a duct therein arranged to be brought alternately into communication with the water feed chamber and the air supply chamber for feeding water and air alternately to the drill steel.

2..A cylinder, its piston chamber, a front head, a water feed chamber therein, a hollow drill steel and a reciprocating drill piston, having a duct therein arranged to be brought alternately into communication with the water feed chamber and the piston chamber for feeding water and air alternately to the drill steel.

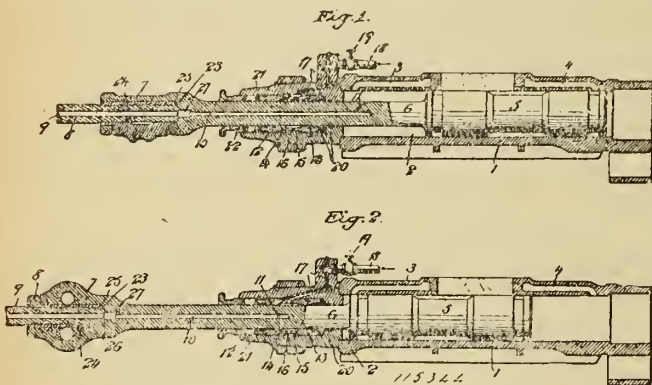
3. A cylinder, its piston chamber, a front head, a sleeve therein having inner and outer connected annular spaces forming a water feed chamber, a hollow drill steel and a reciprocating drill piston having a duct therein arranged to be brought alternately into communication with the water feed chamber and piston



chamber for feeding water and air alternately to the drill steel.

4. A cylinder, its piston chamber, a front head, a sleeve therein having a water feed chamber, a hollow drill steel, a reciprocating drill piston having a duct therein arranged to be brought alternately into communication with the water feed chamber and piston chamber for feeding water and air alternately to the drill steel, a packing for the piston rod at the inner end of the sleeve and a packing for the piston rod and sleeve at the outer end of the sleeve.

5. A hollow drill steel, a piston rod having a duct therein communicating with the bore of the drill steel, a chuck for receiving the drill steel, a bushing and a gasket at the inner end of the bushing, arranged to en-



circle the end of the drill steel for forming a water tight joint at the drill steel seat, the opening in the chuck for the gasket being of less diameter than the opening for the bushing, thus forming a shoulder against which the inner end of the bushing seats.

6. A hollow drill steel, a piston rod having a duct therein communicating with the bore of the drill steel, a chuck for receiving the drill steel and a gasket located at the drill steel seat arranged to encircle the end of the drill steel to form a water tight joint, the said chuck having a transverse hole leading to the gasket for facilitating its removal from the chuck.

7. A hollow drill steel, a piston rod having a duct therein communicating with the bore of the drill steel, a chuck for receiving the drill steel, a bushing and a gasket located at the inner end of the bushing in position to encircle the end of the drill steel at its seat, said chuck having a transverse hole leading to the gasket for facilitating the removal of the gasket from the chuck.

#### No. 115,611. Explosive.

Wesley Oliver and Alfred Stephens, co-inventors, both of Gelert, Ontario, Canada, 15th November, 1908; 6 years. Filed 10th September, 1908. Receipt No. 162,322.

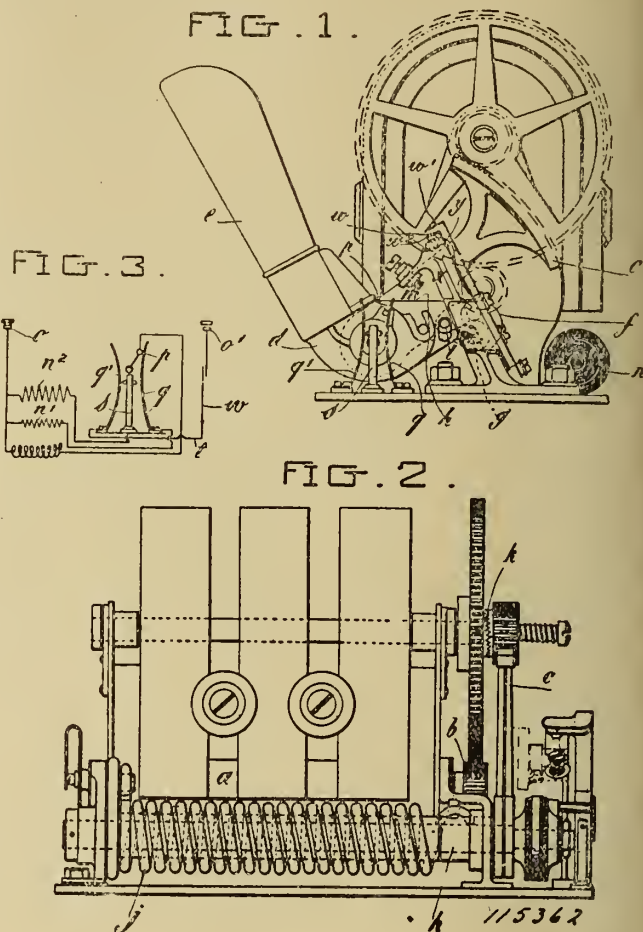
Claim.—An explosive comprising charcoal, sulphur and chlorate of potash, substantially in the proportions set forth.

#### No. 115,362. Electric Apparatus for the Ignition of Mines.

Otto R. B. Berglund, Walter Axel, W. E. Hyorth and Carl E. Spungman, co-inventors, all of Stockholm, Sweden, 1st December, 1908; 6 years. Filed 8th August, 1908. Receipt No. 161,435.

Claim.—In an electric mine igniting apparatus the combination with a magneto and a mine exploding cir-

cuit, a transformer having primary and secondary coils, a pair of spring contacts connected one with the primary coil of the transformer, and the other with the mine circuit, a contact post located between said spring contacts and connected with the secondary coil of the



transformer, said spring contacts tending normally to bear on said contact post and a switch lever electrically connected with the magneto and adapted to contact with one of the other of said springs and on said contact to move it out of contact with the post, and means whereby the lever is operated by the magneto.

#### No. 115,510. Igniter for Blasting Fuses.

Benjamin F. Pearson, Canyonville, Oregon, U.S.A. 8th December, 1908; 6 years. Filed 22nd June, 1908. Receipt No. 159,993.

Claim.—1. A fuse protector and igniter comprising a metal cap having a reduced or contracted outer end and adapted to be applied to the outer end of the fuse, and means in the outer end of said cap whereby the fuse may be quickly ignited, substantially as described.

2. A fuse igniting device comprising a cap or ferrule having a reduced or contracted open outer end, and a wad of highly inflammable material packed in said outer end, substantially as described.

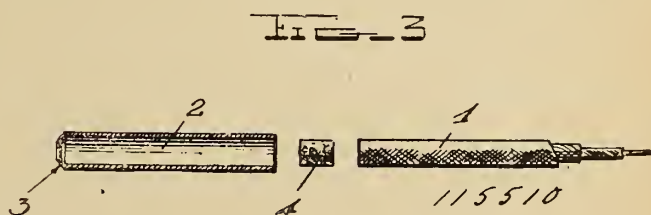
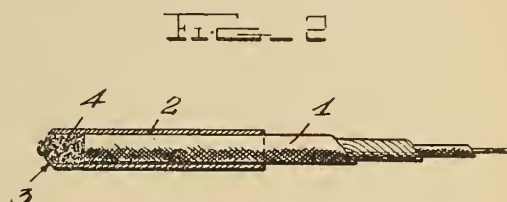
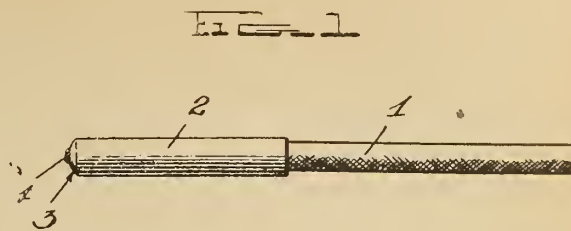
3. An igniting and protecting device for blasting fuses, comprising a ferrule or cap adapted to be applied to the outer end of a fuse, said cap or ferrule having a contracted or inwardly turned open outer end, an igniting wad arranged in said outer end of the ferrule, said wad consisting of a composition of raw cotton, and powder adapted to be packed or rammed into the outer end of the cap, substantially as described.



4. An igniting material for fuses consisting of a composition of raw cotton, gun powder and giant powder constructed in the form of wads, and means to hold said wads in engagement with the end of the fuse, substantially as described.

5. A fuse igniter consisting of raw cotton mixed with gun powder having combined therewith a small percentage of giant powder, such gun powder and giant powder being mixed with water to form a pasty solution which is thoroughly mixed with the cotton and formed into small rolls and dried, after which said rolls are cut into lengths or pieces to form igniting wads, and means whereby said wads are held in engagement with the end of the fuse, substantially as described.

6. A fuse igniter consisting of raw cotton mixed with gun powder having combined therewith a small percentage of giant powder, such gun powder and giant powder being mixed with water to form a pasty solution which is thoroughly mixed with the cotton and formed into small rolls and dried, after which said rolls are cut into lengths or pieces to form igniting wads, and a metallic cap or ferrule adapted to be applied to the end of a fuse to hold said igniting wad in engagement therewith, substantially as described.



## SPECIAL CORRESPONDENCE

### ONTARIO.

**Cobalt.**—The rush of freight from Charlton to Gowganda is greatest about the middle of March, about eight hundred teams being employed. The road from Charlton to Elk Lake is in fair shape, but between the latter place and Gowganda it is very bad. Apparently very little attempt was made to get a good grade, which was an easy thing to obtain, and where it was a question of going over a steep hill, or making the road a mile longer by going round, the contractor struck out for the high places. As a consequence, it takes a good team to pull 500 pounds, and as teams are worth from \$350 to \$600, it can be seen that drawing freight is an expensive item. A great many pitch-holes are encountered and spills are an everyday occurrence. During the third week in March 500 loaded teams left Charlton in one day.

On April 2nd there remained at Charlton only twenty cars of supplies, and these, with five en route, completes the total billed for Gowganda.

Although there are undoubtedly many good properties in Gowganda, the general consensus of opinion seems to be that the district has been grossly misrepresented by some of the papers. This will do much harm, and when the snow leaves the ground the district is undoubtedly due for a bad black eye.

The Bartlett Company were unable to take in their two 80 horsepower boilers, which are now across the lake from the camp. As soon as the ice breaks up sufficiently they will be floated across.

The Gowganda Queen Mining Company has a force of fifteen men at work sinking a shaft on their property west of the Mann claim. The shaft is being sunk on a three-inch vein of calcite carrying silver values.

The new compressor plant of the Moose Horn Mining Company, at Elk Lake, has arrived on the property, and everything is in readiness to install it in a short time. It consists of a 100

horsepower boiler, a three-drill compressor and a hoist. A shaft is now down 60 feet, but as soon as the new plant is in operation, it will be sunk to a greater depth, as the management finds that profitable mining cannot be done on the small veins encountered on the present levels.

Twenty men are employed on the property of the Montrose Syndicate, in South Lorraine, erecting buildings for the steam plant which will shortly be installed. The shaft is now down over thirty feet on a vein carrying cobalt and nickel, but no silver. Sinking will be continued to the 100-foot level before any drifting is done.

Plans and estimates have been prepared for the erection of a suction gas producer plant at Dane, in Boston Township, for the purpose of supplying power to a number of mines in the Larder Lake district. The cost would be in the neighborhood of \$100,000.

Another company has been formed to develop a waterfall, for supplying power to the mines in the Cobalt district. The falls are on the Matabichehewan River, near the mouth of the Montreal River, and it is estimated that 10,000 horsepower can be developed. Surveys have now been under way for several weeks.

A new company called the Paymaster Mines, Ltd., with a capital of \$2,000,000, has been formed by Mr. S. D. Madden. They will probably buy the property of the Cobalt Treasury Mining Company, and with it twenty other claims in Coleman.

The Canadian Copper Company have taken a working option on the big pyrrhotite deposit near Driftwood City. Four diamond drills are being taken in to test the deposit at depth. The option is for \$250,000.

The Drummond mine is said to be under option to Leivishon, of New York, who is heavily interested in Kerr Lake. Negotiations are still under way, as the price has not definitely been settled on.

The Verner Silver Mining Company, owning two claims in the Matabichehewan district, have been doing development work



during the winter on veins discovered by trenching. Shaft has been sunk on one of the veins, for a depth of twenty feet, and will be continued to the 75-foot level. Camps have been erected and the company may install machinery in the spring.

A force of thirty men are at work on the claims of the Langham Mining Company, in James Township. The shaft is now down over fifteen feet, and will be continued to the 100-foot level before any drifting is done. A calcite vein is showing in the shaft.

Good progress is being made at the Chambers-Ferland, and the company expects to ship five cars of ore in April. A sixty-foot crosscut will be run from the 100-foot level of the No. 1 shaft, to cut the rich vein which has been worked on the La Rose. A drift will be started from the No. 60 shaft of the Nipissing Mining Company to develop the Chambers-Ferland ground. This shaft has been leased from the Nipissing. The crosscut being run by the Right of Way to tap the veins under the compressor building, will soon be in the required distance.

The Lumsden, mine located out near the Temiskaming, is putting in a small steam plant, consisting of a 20-h.p. boiler and a 6x8 hoist. This temporary plant will be used to sink the shaft to the 150-foot level.

The contract which called for the sinking of a 125-foot shaft, on the Hylands property in Coleman, has been completed. A station has been cut at the lower level, and a drift started on the vein, which shows up well in the shaft.

A diamond drill is doing prospecting work at the Badger mine, and one hole, having a vertical depth of 250 feet, was put down under the swamp. It failed to locate any veins. A force of men are at work repairing the timbers in the shaft, and putting the buildings in condition.

The new vein, found about two weeks ago at the Cobalt Lake, is being drifted on, and continues to show good values. Reports have been circulated that No. 6 shaft was flooded by water from the lake, but these reports are without foundation.

The Crown Reserve has made a find in the shape of a 2-inch vein, carrying high silver values, found in the north crosscut being run east under Kerr Lake. Another new vein was discovered in the east crosscut at the 100-foot level. The shaft sunk from the open cut is now down over 165 feet, and will be continued to the 200-foot level.

At the Floyd the shaft is now down over two hundred feet, but as the vein is badly broken up in the bottom, sinking will be discontinued.

The west drift from the No. 4 shaft of the Cobalt Lake Mining Company, which has been leased to the Cobalt Station Grounds Company, is now within a short distance of the latter company's boundary. In the north Lake shaft the drift is also very close to the line. A force of twelve men are employed.

At the 100-foot level of the winze, sunk from the tunnel of the Mother Lode mine, a crosscut to the west tapped the vein on which the tunnel was originally driven. The ore shows good values at this depth, which is about 240 feet from the surface.

A new vein, showing values in native silver, has been located on the surface at the Kerr Lake Majestic, about 120 feet north of the main shaft. The main shaft is down over 45 feet on the vein, but it will be continued to the 125-foot level before any drifting is done. Another shaft is to be sunk to a depth of 100 feet, with the expectation of striking some of the Drummond and Kerr Lake veins. A force of thirty men are at work on the property.

The plant of the Ophir mine, consisting of a 100-h.p. boiler, a seven-drill compressor, and a 6x8 hoist, has been installed.

The Temiskaming mine has made an important strike on the Ganz lot, the vein being about 10 inches wide and carrying high grade silver values. The mine is in excellent condition, the de-

velopment work being kept well ahead of the stoping. The ore on the 250-foot level is proving richer as the drift is driven to the vein.

The plant of the Red Jacket is now on the ground and the company expect to turn on the air about April 15th.

The Michigan Cobalt Silver Mining Company, owning properties south of the Farrah, are starting to sink a shaft. The hoist is run by a 25-h.p. boiler, and air for one drill is being obtained from the Kerr Lake Majestic. The shaft is being sunk away from the vein, and at the 100-foot level a crosscut will be run to tap it. The vein was discovered by surface prospecting last fall, and is about five inches in width.

The new plant of the Consolidated Mines Company is now in operation. Two drills are being employed sinking on the Green Meehan, while a 3-inch line has been laid to Red Rock, to supply air when the management decides to commence work.

The Silver Tunnel Mining Company, adjoining the Otis Curry on the north, has discovered a new 3-inch vein carrying silver values. This makes a total of six new veins found this year. A tunnel 200 feet long will be driven on one of the veins and crosscuts will be driven from the face. A small plant consisting of a 40-h.p. boiler, and two drills will shortly be installed.

The Crown Jewel Mines Company have received permission from the Government to increase their capitalization from \$350,000 to \$1,000,000.

It is reported that one of the two diamond drills working at the Silver Queen has located a new 6-inch vein of high grade ore.

The directors of the Muggley Concentrator have decided to make additions to the mill that will increase the capacity to about 120 tons a day.

Operations have been suspended in the underground working of the Peterson mine, and prospecting is being carried on by means of diamond drills. One hole has been started from the surface and when that is completed, the drill will be moved to the bottom of the shaft, and horizontal holes bored to test the surrounding country.

A diamond drill is being used to prospect the Gamey property, now owned by the Cobalt Central.

The plant of the Blackburn mine, Miller Lake district, is now on the ground, and is being installed. It consists of three 50-h.p. boilers, two 3-drill compressors and 2 hoists. The power will be generated in one central station and lines to carry the air will be laid to the separate workings.

On April 2nd a 4-inch vein was found at a depth of 75 feet in the crosscut to the west of the main shaft of the Gold Consolidated Mining Co. at Cart Lake.

The Casey Cobalt Mining Company, operating north of New Liskeard, have sunk a 260-foot incline shaft on a cobalt vein. At the 220-foot level a station has been cut and drifts started in both directions. The company has staked sixteen other claims in the vicinity of their property. A small shipment of cobalt ore will probably be made in April.

Good progress is being made by the Brydgette Syndicate, operating 20 acres in the northwest corner of Peterson Lake. The new plant, consisting of a 125-h.p. boiler, a six-drill compressor and a hoist, is now ready, and all the buildings are completed. The shaft, which is down 50 feet, will be continued to the 150-foot level, at which depth crosscuts will be run to prospect the surrounding country, and to tap the veins that have been located by surface prospecting.

On the Peterson Lake lease of the Little Nip, at the 150-foot level, a good pay chute has been located on a vein in which considerable development work had previously failed to show silver values. Another vein, 4 to 6 inches wide, was also found on the 200-foot level. The ore is high grade, and the wall rock for a foot on each side is well mineralized.



The Montreal Reduction Company, at Trout Mills, is putting in furnaces to treat the high grade ore from this district, and when these are in operation the company expects to be able to treat the ores, at a lower charge than Denver or Perth Amboy.

The Nipissing Reduction Company's mill has been undergoing extensive alterations for the past month, but the company expects to have things in running order again by April 15th. The mill was originally designed as a dry concentrator, but this method proved to be a dismal failure. The concentrating machines were then thrown out and wet tables installed, while the crushing end remained dry. Although satisfactory results were obtained the company realized that more economical results could be obtained if the plant were running entirely on the wet process, so the necessary changes were made. The crushing end consists of two 6x20 jaw crushers, six sets of rolls, and a Hardinge mill. The concentrating end consists of four double compartment Hartz jigs, two Wilfley tables, seven James tables, and a James slimer. The capacity will be 80 tons a day.

### BRITISH COLUMBIA.

**Boundary.**—About a week ago the British Columbia Copper Co. posted a notice at their works that they would cease operations about April 1st but it has now transpired that such will not be the case and that the mines and smelter will be kept going unless copper drops to a much lower price than is prevailing at present. It is stated that the Greenwood miners' union upon hearing that it was likely the company would stop work voluntarily offered to accept a reduction of 10 per cent. in wages and the Copper Co. informed the miners that if such an arrangement was made it would reduce the price of board and supplies 10 per cent. to correspond. The B. C. Copper Co. has paid the first installment of \$10,000 on the bond of the properties recently acquired in Wellington camp. The purchase price was about \$100,000. The mines are showing up well and there is a large quantity of good ore on the dumps ready for shipment as soon as the new railway spur is built in.

The Greenwood city council seems favorably inclined to the tunnel scheme proposed and has passed a by-law bonusing the project for about \$50,000—\$15,000 to be paid when the tunnel is in 3,000 feet, a similar amount when the adit has been driven 6,000 feet and the balance when the work is advanced to Phoenix camp. This by-law will be put to a vote of the people and if that is favorable it is likely that work will be started immediately.

Work will soon be resumed at the mill and Nickel Plate mine of the Daly Reduction Co., at Hedley. Mill Superintendent Holbrook and Mine Superintendent Jones are in their places organizing their working forces and getting the flume and other surface appliances in form for an early resumption of operations.

A force of men is working on development at the mines of the Donald Copper Co., three miles west of Midway. Eighteen men are working at the Golden Eagle Mine, Volcanic Mountain. Six cars of ore averaging \$23 per ton were shipped last week and for the near future about a car a day will be sent out regularly.

Mining has again been resumed at the Snowshoe Mine of the Consolidated Co. Shipping has been going on regularly but the ore was being taken from the reserves which have been cut down considerably, making it advisable to start stoping again. The tunnel on the Phoenix-Amalgamated group of this same company is nearly complete. A goodly tonnage of ore has been placed in the stoping area by the development work done during the past few months. The next progressive step in the plan of this property will be building the railway spur into the property to afford economical shipping facilities.

A small mill is being built on the West Fork of Kettle River to treat the second class ore of the high-grade mines near

Beaverdell. An experimental mill is also being built at the Jewell Mine. This is a slimes process the invention of H. Nicholls of the Ymir Mine.

A 5-foot vein of good coal has been uncovered about three miles west of Midway, B.C. The presence of this vein has been known of for some time and the formation thereabouts is favorable but this is the largest vein located so far.

**Rosslund.**—The rich ore shoot on the 90 level of the War Eagle Mine is opening up in good quantity and the ore is maintaining its quality. Work in other parts of the group of the Consolidated Co. is giving good results and the prospects are fine for a big tonnage and substantial profits this year.

With the advent of spring the miners are beginning to look up properties to lease and there are several parties after the Evening Star and other likely mines. A few small pockets of ore carrying coarse free gold have been opened up in the I.X.L. Mine by the lessees and work is being pushed vigorously in the hopes of soon encountering one of the bonanza pockets. The mill is being repaired at the O. K. and mining and milling operations will soon be resumed on that property by the lessees.

There is nothing new in Le Roi affairs and there is not likely to be much of consequence done until Mr. McMillan has started raising funds in London. The Northport smelter, which has been treating a small tonnage from the Sheep Creek, Ymir and adjacent British Columbia mines and also a tonnage from small mines along the Great Northern in Washington, as well as the Le Roi ore, will shut down indefinitely in a few days, or just as soon as the work of cleaning up can be completed.

The old War Eagle, Centre Star and St. Eugene mining companies, which were taken over by the Consolidated Mining & Smelting Co. of Canada, are being wound up by C. R. Hamilton, liquidator, Rosslund, B.C.

The fiscal year ending September 30th, 1908, was the best one financially that the Le Roi 2, Limited, has so far had in the history of its work in this camp. The annual report shows a balance in favor of profit and loss of £53,053 2s. 6d. During this period the company shipped 29,648 tons of ore of an average value of \$23.60. The mining cost including depreciation, was \$5.31 per ton; smelting and freight charges were \$5.55.

**Nelson District.**—The news that the coal miners of the Crow's Nest and Alberta districts had decided to strike was received here with some apprehension, even though it is said that the Crow's Nest Pass Coal Co. will continue to work. It is thought that the leaders and officials have misled the men as is too often the case in affairs of this kind.

The Second Relief mine at Erie has been bonded by A. B. Cooper, President of that Company, to Wisconsin mining men, who are represented in the deal by R. W. Allen.

Work will soon be resumed on the Eva gold mine at Camborne. The property is on the market as being for sale, but the owners have nevertheless provided funds with which to get to work.

A number of the smaller properties have appeared on the shipping list lately among them being the Bismark, 255 tons; Yankee Girl, 94; Mother Lode, 48; Hope, 8; Fisher Maiden, 78; Ruth, 145; Emerald, 623, etc.

Work has again been started on the old Payne mine. A plan of diamond drill exploration will be carried out in an effort to find the continuation of known and rich shoots of ore in the workings.

Thirty men are working on the Standard property at Silverton. This group comprises ten claims from which over 245 tons of ore have already been shipped this year. This ore is valued at about \$35 per ton or over \$750 per car.

D. C. Corbin, the Spokane railway magnate, has bonded the Wagner group of claims on the Upper Duncan River. This group



is valued at nearly one million dollars. It is anticipated that Mr. Corbin will have enough influence with the "powers that be" to get that long looked for railway line built up the Duncan, in which case the many rich mines in that locality will be afforded facilities that will enable them to be worked and ship at a profit.

The long tunnel at the Hosmer mine has now been driven over 4,100 ft. and so far but eight of the fourteen known coal veins have been pierced. It may be found necessary to drive this adit 8,000 feet altogether. There are 80 coke ovens now in commission at Hosmer, about one-third of what the first installation will amount to.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Port Morien.**—The output of the North Atlantic Colliery Co. is now 400 tons daily. Satisfactory progress is being made in development work, and it is expected that the output will reach 500 tons by the time navigation opens.

**Sydney.**—The Marsh Mine, of the Nova Scotia Steel & Coal Co. is to be shut down indefinitely on March 31st.

### ONTARIO.

**Seaforth.**—A well has recently been sunk one mile southwest of Beachville, Oxford County, for the Standard White Lime Co. It was drilled with the expectation of striking gas, but although all formations from corniferous limestone to Laurentian granite were penetrated no gas was encountered. At a depth of 150 feet a flow of 150 gal. per minute of potable water, slightly sulphurous, was obtained. Salt water was met with at 665 feet. The total depth reached was 2,789 feet, or 1,896 feet below sea level.

**Maple Mountain.**—The shaft on the property of the Canadian Ores Co. is down 120 feet, and will be driven to the 150-foot level before another station is cut. At the 75-foot level a crosscut was run 40 feet northeast and caught the main vein. Where caught the vein ran from three and a half to six inches in width of calcite, smaltite and silver. A large plant is at present being installed consisting of a ten-drill compressor, two 100 horse power boilers, a large hoist with pumps, etc. The plant will be running in a short time.

**Cobalt.**—Very little underground work is being done at the Badger Mine, the main work being confined to the timbering and straightening of their main shaft. This shaft is down 225 feet and some drifting has been done at that level. A large cage has been ordered and shipped for hauling muck from the various levels of No. 9 shaft. At present 55 men are employed.

From the 200-foot level of the Rochester the crosscut to the east has been driven thirty-four feet, but the vein, which they expected to catch thirty feet from the shaft has not yet been located. A force of fifteen men are employed under Mr. C. E. Beard.

The Right of Way Mining Co. have opened up a new vein in the winze below the first level of No. 3 vein, which will probably carry over into Princess ground. It is 5,000 ounce ore and is about 6 inches to 8 inches wide.

The Kerry Mining Company have run across a vein on their Cart Lake lease, carrying silver at the 100-foot level. The vein was struck 120 feet from their shaft, and is four inches wide of calcite with silver. On the other lease held by the company situated on Peterson Lake, the workings are down over 125 feet. Forty men are employed on the property.

An 18-inch vein assaying 5,000 ounces was struck recently in the north drift at the 250-foot level of the Temiskaming.

**Vancouver.**—The Granby Consolidated Mining, Smelting and Power Co., of Grand Forks, B.C., has bonded a rich group of copper claims near Tassu Harbor, Moresby Island. One payment has been made on the purchase price, which is approximately \$100,000. A ledge on one of the properties there is 250 feet wide of chalcopryite, carrying 8 per cent. to 16 per cent copper, \$6 to \$14 gold and \$1.80 to \$2.20 silver.

Kamloops keeps active and on the strength of the mining situation considerable real estate is changing hands. The arrival of W. O. Young to take up the bonds he has on a number of properties, is looked forward to with some expectation. Work is going on at the Iron Mask, Kimberley and Copper King.

The Silver Cross Mine is installing a three-drill air compressor and a new boiler, and crosscutting will be resumed. The last shot put in the crosscut at the 20-foot level cut a good vein of calcite and smaltite.

The Pontiac Mine is now down 70 feet and drifting towards the Silver Cross line, which is between 200 and 300 feet away. The Pontiac will rent air for one drill from the Silver Cross.

At the Trethewey vein G has been sunk 230 feet, and three levels have been worked. On the third level a drift has been run 160 feet until it lies under No. 2 shaft. Vein H has been worked for 600 feet east and west on the 150-foot level. On the second level of No. 1 shaft a drift is being run east on E vein. The drift is 170 feet and the vein averages four inches of cobalt carrying some silver. A crosscut 650 feet in length connects this shaft with No. 2.

A sample of the Silver Cross dump from September 2nd, was shipped to the Behrend Concentrators, Ltd., at Montreal, for concentration, with the result that the dump produce was brought up to a valuation of \$400 from low values.

The main shaft of the Temiskaming and Hudson Bay Mining Company is down a depth of 200 feet, with stations cut at each fifty feet. The drift in the main vein has now been driven nearly 200 feet to the east, the vein showing an average width of eight inches of smaltite and native silver. A crosscut is being driven to catch their No. 3 vein and the Trethewey vein.

The Canadian Copper Co., of Copper Cliff, have taken an option on a group of claims near Driftwood City on the T. & N. O. They are placing four diamond drills to test the deposits, which are of nickel, to a great depth.

**Elk Lake.**—Nearly twenty-five companies, including properties around Elk, Silver, Miller and Gowganda Lakes, have installed or ordered machinery to work their claims.

The Principal installations in the Gowganda Lake district include: The Bartlett Mines, with a 12-drill compressor, boilers, hoists, pumps, drills, etc.; the Boyd-Gordon, with a 6-drill compressor, etc.; Reeves-Dobie, with a four-drill compressor, etc.; and the Mann, which has installed two plants, each with a twenty horse power boiler to run the drills and hoists by steam.

Plants have been ordered for the Gates and Bonsall properties in the Miller Lake district.

The majority of the new plants will be in the vicinity of Elk Lake City and Silver Lake. Last winter the Moose Horn put in a steam plant run by a fifteen h.p. boiler, which has been replaced this winter by a three-drill compressor.

The first compressor plant in the district was the six-drill compressor installed by the Elk Lake discovery.

The Otisse Mine have an eight-drill compressor plant working and the Otisse-Currie are installing a plant of the same capacity.

The Gavin-Hamilton, Big Six, Copper Cliff, Hayden and Toledo Mines are all installing plants at the present time.



In Nos. 1 and 2 veins of the Elk Lake Discovery a shaft has been sunk for a distance of forty-two feet. The veins are calcareous, carrying niccolite and leaf silver. At the fifty-foot level a shaft will be cut and some drifting done, and then the shaft will be continued to a depth of 150 feet before any considerable underground development will be done.

A six-drill compressor, sixty-five horsepower boiler, and four drills are being installed at the Gavin-Hamilton. The shaft is now down fifty-seven feet, and drifting has been commenced.

A new strike is reported from the Otisse-Currie property. The new vein is 18 inches wide and has been traced for 200 feet. It is on another part of the property from which the present shaft is being sunk. The present shaft is now down 25 feet and will be sunk to the 100-foot level before crosscutting is started.

**Port Arthur.**—The West End Silver Mountain Mine, which has been closed down for the past year, is to be re-opened within a few days. The Porcupine, another property belonging to the same company, the Consolidated Mining Co., is to be re-opened also.

The news comes from the Sturgeon Lake region that the St. Anthony Reef Gold Mine will re-open shortly.

#### BRITISH COLUMBIA.

**Fernie.**—The Crow's Nest Pass Coal Co. has ten mines in operation, but only two are productive at present. By next October the production will probably be 6,000 tons, or, perhaps, 10,000 tons per day. The company have under consideration the building of 1,000 coke ovens.

The new agreement recommended by a joint conference of miners and operators at Macleod, Alta., was ratified by the Fernie miners by a majority of 250, and the district officials signed the agreement March 30th. It is for two years, and covers all mines except Nos. 1 and 9. It is practically the same as the former agreement, but it is claimed that the better working conditions provided will permit of a ten to fifteen per cent. advance in earnings.

**Rossland.**—Fire broke out in the 400-foot level of the Centre Mine on March 18th, about eighty feet from the shaft on the west stope. It was extinguished after a strenuous fight lasting about twenty hours.

A stamp mill is shortly to be erected at the Jewel Mine. The machinery has already arrived.

**Grand Forks.**—The Granby is operating seven of its eight furnaces, one being out of commission owing to its being enlarged to the size of No. 1 furnace. When this enlargement is completed No. 3 will be torn down and enlarged, as well as all the rest of the battery, one furnace being enlarged at a time. Fourteen per cent. of the men at the mines at Phoenix will be laid off during the enlargement process.

**Greenwood.**—The B.C. Copper Company announced that owing to the condition of the copper market, they would close

down their mines and smelter. Later, however, word was received from New York of a better outlook and work will continue as usual.

**Nelson.**—A three-foot pay-streak has been struck in the Summit Mine at Sheep Creek. It is typical sulphide ore, samples of which many prominent mining men say to be among the richest yet seen in British Columbia. The Summit shipped half a carload of ore two years ago, but since that time work has been confined to development. Shipments to Trail smelter will commence at once.

Thos. Kiddie, manager of the Northport smelter, has announced that that enterprise will close down owing to the shutting down of the Le Roi Mine at Rossland from lack of ore.

A gold brick weighing 465 ounces and valued at over \$7,000 has been brought in from the Nugget Mine at Sheep Creek. This is the result of about three weeks' work of the mill on ore mined from development work.

A. B. Cooper has bonded the Second Relief Mine at Erie to a Wisconsin Syndicate for \$140,000. The property is well developed and has a fine stamp mill.

The option on the Nugget Mine, which expired recently, has been renewed at a greatly increased figure, to the same parties.

**Vancouver.**—Extensive development will take place at the copper-gold camp at Tassoo Harbor, Moresby Island, this summer. The Granby Company recently acquired the O'Connor Group, and the Tyee Smelter has bonded the Harris Group. A group of twenty claims is owned by a syndicate composed of Messrs. A. Gowing, of Kootenay; F. C. Elliott and Hon. Thomas Taylor, of Revelstoke, and J. E. Corlett, of Seattle.

Mr. Justice Clement has issued an order for the sale of the Dominion Copper Company properties to satisfy the mortgage held by the National Trust Co., of Toronto, trustees for the bondholders. The order, however, only covers those properties acquired by the bond issues back of the mortgage.

**Nanaimo.**—The Vancouver Briquette Company intends to instal a plant in this city at a cost of \$30,000 or more, that will have a capacity of 100 tons per day.

The company has an agreement with the Vancouver-Nanaimo Coal Company for a supply of slack coal and has secured a site near Hoggan's Wharf.

#### YUKON.

**Dawson.**—A strike of from three to fifteen dollars to the pan has been made on Lower Glacier Creek, 80 miles west of Dawson. The new pay is on the protruding tip of the land lying between the forks of Glacier and Big Gold. The depth to bed rock is 16 feet, and the pay has been traced 300 feet up and down stream, 30 feet wide.

The Stewart River Dredging Company intend constructing two additional gold dredges this season for use on the Stewart River. The company had one dredge in operation last season, with very satisfactory results.

## MINING NEWS OF THE WORLD.

#### GREAT BRITAIN.

The output of coal last year was 261,506,379 tons, as against 261,812,852 tons in 1907, a decrease of 6,306,473 tons. The decrease in the output is at the rate of 2.35 per cent.

The number of persons employed under the Coal Mines Regulation Act was 987,813, of which number 796,329 were employed underground, the total the year previous being 940,618, showing an increase last year of 47,195.

The total output of minerals under the Metalliferous Mines Regulation Act during the year was 3,124,397 tons, against 3,338,024 tons in 1907. The chief item was 1,549,469 tons of

iron ore, against 1,802,946 tons in the preceding year. The number of persons employed was 29,927, against 31,602 in 1907.

Lord James of Hereford, the independent chairman, has given his casting vote in favor of a reduction of five per cent. in the wages paid in the Federation area in England and North Wales.

#### RUSSIA.

The Assistant Minister of Commerce has announced that a bill is to be submitted to the Douma fixing the responsibility for reckless exposure of lights in mines.



The Naptha works at Bibi Eibat have been burnt. Five of the Subaloff works, one of the Rothschild, two of the Schibaieff, and two of the Wotan Company's works have been burned down. Two Mahomedan peasants, suspected of incendiarism, have been arrested.

#### GERMANY.

The collapse of the Lorraine Luxemburg Pig-Iron Syndicate has now thrown the German pig-iron trade open to competition. The first effect of the dissolution has been a reduction of 2s. in the price of Luxemburg foundry iron.

The Krupp Company and the German Arms and Ammunition Company, of Berlin, are reported to have received from the chief of the Argentine Military Commission large orders for war material for Argentina.

#### PRUSSIA.

The Prussian Government has introduced a bill in the diet forbidding foreigners from acquiring mineral properties and operating mines within Prussia without the special permission of the King or the authorities representing him.

#### NORWAY.

An electric furnace for the production of pig iron on a commercial scale has been installed at Ludvika, Norway. The installation will include two high pressure furnaces of 2,500 horsepower each, two steel furnaces, 600 horsepower, and all will be supplied with a two-phase current. Later on additional furnaces will be installed.

#### UNITED STATES.

The anthracite miners of Pennsylvania at the convention in Scranton, Pa., decided to remain at work after April 1st and to allow the union's district executive boards in the Pennsylvania hard coal fields to continue their efforts to seek an agreement with the operators.

The production of the Lake Superior iron mines during February amounted to approximately 18,100,000 pounds fine copper, indicating a rate of production nearly 7 per cent. greater than for the same period a year ago.

The most perfect method known of eliminating arsenic from smelter smoke is in use at the Washoe smelter at Anaconda, Mont., and that does not prevent the escape of some arsenic from the smelter stack. While the company saves about 2 tons of pure arsenic daily, there still escapes through the stack and into the atmosphere about 10 tons of arsenic trioxide every day. The method employed for eliminating the arsenic is by flues and furnaces.

Several of the largest foundrymen and iron manufacturers in Milwaukee have formed the American Oxhydric Company, and work has been started on a factory. This company has purchased all the patent rights to a German invention for cutting and handling iron and steel by a secret gas process which

eliminates all the powerful and expensive machinery now necessary for this work.

Statistics of the output of steel in the United States last year exhibit a remarkable shrinkage. The total production was 14,018,000 tons, as against 23,363,000 tons in 1907, a decline of 9,345,000 tons or 40 per cent. The greatest contraction was shown in Bessemer steel, which fell off by nearly 50 per cent., from 11,668,000 to 6,117,000 tons. Open Hearth dropped from 11,550,000 to 7,781,000 tons, or 32 per cent.

#### SOUTH AFRICA.

An expedition, under Prince Boris, is being organized to visit Portuguese East Africa to recruit native labour to work in the South African mines.

During the year 1908 there were 1,429 diamond diggers working on the Vaal River. The output averaged 54½ carats, or £181 per claim holder. In 1907 there were 1,133 diggers, whose average was 46½ carats.

A company has been formed in Berlin to take over and exploit the diamond mining rights in German Southwest Africa, held by the German Colonial Company. Diamonds have been found along the coast for seventy-five miles from the Orange River.

Asbestos deposits of the Chrysotile variety are being developed in the Carolina district of Eastern Transvaal, and the Victoria district, Rhodesia. The crude produced is of good quality and 60 per cent. of it shows fibres over 1 inch long.

Something like 800 new stamps, and the equivalent of 400 more, in the shape of tube mills, will be installed in Rand mines during the first three months of 1909.

#### AUSTRALASIA.

The Australian Government's Iron and Steel Bounties Bill provides for the payment of a bounty of 12s per ton on pig iron made from Australian ore and on puddled bar iron and steel made from Australian pig iron.

#### MEXICO.

Three furnaces are in blast at the Chihuahua smelter of the American Smelting and Refining Company. It is stated that the diversion of ore hitherto going to the El Paso plant makes necessary the early erection of two additional furnaces whereby the plant's capacity will be about 1,250 tons daily.

It is announced that the Greene Mining interests in the State of Chihuahua, known as the Greene Gold-Silver Company, are to pass into the hands of an English concern, headed by the Rothschilds, of London. They have had their engineers in the field for several weeks.

Owing to a leakage from the river into the Natividad Mine, in Teojomulco district, it was necessary to blast out the bed of the river and cover a portion of it with cement. The work has been completed and the river turned back into its course.

## COMPANY NOTES.

#### DOMINION COAL CO.'S ANNUAL REPORT.

The annual report of the Dominion Coal Company shows that the net profits for the year were \$2,686,202, against \$2,094,539 in 1907, and the balance after interest and dividends was \$1,600,162. The total surplus for the year is \$4,253,471, against \$2,828,308 last year.

The output for 1908 was 3,555,068 tons, as compared with 3,541,253 tons for 1907, an increase of 13,815 tons. The navigation conditions were generally favorable to the company's operations, except during September and October, when the

smoke from forest fires seriously affected shipping in the St. Lawrence.

During the year the company's property generally has been efficiently maintained and mine developments steadily carried on. With the exception of three fires in surface buildings, where the loss was fully insured, there have been no serious accidents or unusual occurrences.

In the Lingan Victoria district, where the two pits, Nos. 12 and 14, have been recently opened, the developments for making them productive mines are being steadily pushed, and though the



Output from these pits is not at present required, the work has been carried on so that they may be ready for future requirements. The question of how far this work will be prosecuted in the immediate future depends on industrial conditions. The branch railway (seven miles in length) connecting this district with the main line of the company, and necessary sidings, are now completed. In this district a large reservoir, containing 300,000 gallons, and a small one of 700,000 gallons, have been constructed, and underground pipe system for supply water and protection has been laid.

Most careful attention is being paid to the getting of large quantities of coal, and special machinery is being provided to minimize breakage in shipping and stocking. The demand for the coal is increasing on account of its high calorific value, continues to be maintained in spite of competition by American operators to capture a portion of the Canadian trade in order to offset a lessened demand caused by dull trade conditions in their own country.

#### NIPISSING DIVIDEND.

The directors of the Nipissing Mines Co. have declared the regular quarterly dividend of 3 per cent. and an extra of 2 per cent. This is the same amount as was paid three months ago. The financial statement presented showed cash, bullion, ore

en route to the smelters, and ore at the mines to the value of \$1,009,000. On December 20th last the surplus was \$972,643.

Besides paying the extra dividend of 2 per cent., amounting to \$120,000, the company has added to its surplus, and in addition has about \$700,000 more ore in sight at the present time than it had on January 20.

#### LA ROSE BONUS AND DIVIDEND.

The directors of the La Rose Mining Co. have declared the regular quarterly dividend of 3 per cent. and a bonus of 1 per cent., payable April 20th.

#### LA ROSE CONSOLIDATED MINES COMPANY.

Notice is hereby given that a dividend of 3 per cent. for the quarter ending 28th February, 1909, and a bonus of 1 per cent. has been declared upon the outstanding capital stock of the Company, and will be paid on the 20th day of April, 1909, to shareholders of record at the close of business on 1st April, 1909.

By order of the Directors, the transfer books will be closed from the close of business on 1st April, 1909, and remain closed until 10 a.m. on 27th April, 1909.

Dated the 22nd day of March, 1909.

LA ROSE CONSOLIDATED MINES COMPANY,  
Per D. A. Dunlop,  
Secretary-Treasurer.

## STATISTICS AND RETURNS.

The coal shipments of the Nova Scotia Steel and Coal Company for February and the two months are as follows:—

|                        |        |
|------------------------|--------|
| February, 1909 .....   | 20,928 |
| February, 1908 .....   | 41,230 |
| Decrease, 1909 .....   | 20,302 |
| Two months, 1909 ..... | 56,773 |
| Two months, 1908 ..... | 88,980 |
| Decrease, 1909 .....   | 29,207 |

#### DOMINION COAL OUTPUT.

The output of the Dominion Coal Company during March was 251,585 tons, compared with 346,529 tons in March of 1908. For the three months to date the output totals 661,417 tons, compared with 946,286 tons for the corresponding period of 1908.

#### CUMBERLAND COAL CO.

The shipments for the month of March from the Cumberland Collieries were 35,435 tons.

#### COBALT ORE SHIPMENTS.

Following are the weekly shipments from the Cobalt camp, and those from Jan. 1st, 1909, to date:

|                        | Week ending<br>March 20. | Since<br>Jan. 1. |
|------------------------|--------------------------|------------------|
|                        | Ore in lbs.              | Ore in lbs.      |
| Buffalo .....          | 45,350                   | 223,570          |
| Crown Reserve .....    | 115,520                  | 1,183,440        |
| Chambers-Ferland ..... | 117,440                  | 309,440          |
| King Edward .....      | 44,130                   | 98,050           |
| La Rose .....          | 195,000                  | 2,865,140        |
| Nipissing .....        | 351,080                  | 2,774,329        |
| Nova Scotia .....      | 79,420                   | 480,810          |
| O'Brien .....          | 77,200                   | 269,180          |
| Temiskaming .....      | 40,000                   | 470,000          |
| Trethewey .....        | 56,620                   | 525,550          |
| T. & H. B. ....        | 60,000                   | 564,060          |

Ore shipments to March 20, 1909, are 12,141,353 pounds, or 6,070 tons.

The total shipments for week ending March 13 were 1,181,360 pounds, or 591 tons.

|                        | Week ending<br>March 27. | Since<br>Jan. 1. |
|------------------------|--------------------------|------------------|
|                        | Ore in lbs.              | Ore in lbs.      |
| Crown Reserve .....    | 114,540                  | 1,297,980        |
| Cobalt Central .....   | 40,000                   | 161,755          |
| Chambers-Ferland ..... | 60,000                   | 369,440          |
| City of Cobalt .....   | 53,592                   | 579,522          |
| Kerr Lake .....        | 62,000                   | 327,142          |
| La Rose .....          | 260,000                  | 3,125,140        |
| Nipissing .....        | 258,770                  | 3,033,099        |
| Right of Way .....     | 62,008                   | 524,090          |
| T. & H. B. ....        | 46,600                   | 610,600          |

Ore shipments to March 27, 1909, are 13,098,863 pounds, or 7,549 tons.

Total shipments for week ending March 27 were 957,510 pounds, or 478 tons.

|                        | Week ending<br>April 3. | Since<br>Jan. 1. |
|------------------------|-------------------------|------------------|
|                        | Ore in lbs.             | Ore in lbs.      |
| Buffalo .....          | 55,520                  | 279,090          |
| Coniagas .....         | 65,800                  | 461,205          |
| Crown Reserve .....    | 123,476                 | 1,421,456        |
| Cobalt Central .....   | .....                   | 161,755          |
| Chambers-Ferland ..... | 60,000                  | 429,440          |
| City of Cobalt .....   | .....                   | 579,522          |
| Kerr Lake .....        | 55,940                  | 383,082          |
| King Edward .....      | .....                   | 98,050           |
| La Rose .....          | 260,070                 | 3,385,210        |
| McKinley-Darragh ..... | 55,160                  | 420,040          |
| Nipissing .....        | 218,090                 | 3,251,180        |
| Nova Scotia .....      | .....                   | 480,810          |
| Nancy Helen .....      | .....                   | 40,000           |
| Peterson Lake .....    | .....                   | 132,960          |
| O'Brien .....          | 127,970                 | 397,150          |
| Right of Way .....     | 119,800                 | 643,890          |

|                    |         |
|--------------------|---------|
| Silver Queen ..... | 65,000  |
| Temiskaming .....  | 470,000 |
| Trethewey .....    | 129,000 |
| T. H. & B. ....    | 610,600 |
| Muggley Cons. .... | 72,900  |

Ore shipments to April 3, 1909, are 14,369,689 pounds, or 7,184 tons.

Total shipments for week ending April 3 were 1,270,826 pounds, or 635 tons.

#### CROW'S NEST PASS OUTPUT.

The output of the Crow's Nest Pass Company's collieries for the week ending March 26th was 16,605 tons, a daily average of 2,767 tons.

The output for the week ending April 2nd was 10,961 tons, a daily average of 1,827 tons. All the collieries were idle on the 27th, and that at Coal Creek on the 29th, discussing the new agreement.

#### BRITISH COLUMBIA ORE SHIPMENTS.

The following are the ore shipments for the week ending March 20th and year to date:—

##### Boundary Shipments.

|                   |        |         |
|-------------------|--------|---------|
| Granby .....      | 18,976 | 210,238 |
| Mother Lode ..... | 8,610  | 88,480  |
| Snowshoe .....    | 2,419  | 22,921  |
| Sallie .....      | 20     | 61      |
| Other Mines ..... |        | 1,502   |
| Total .....       | 30,025 | 323,202 |

##### Rossland Shipments.

|                            |       |        |
|----------------------------|-------|--------|
| Centre Star .....          | 2,660 | 28,925 |
| Le Roi No. 2.....          | 541   | 6,665  |
| Le Roi .....               | 758   | 9,218  |
| Le Roi No. 2, milled ..... | 260   | 2,700  |
| Other Mines .....          |       | 92     |
| Total .....                | 4,219 | 47,600 |
| Total .....                | 3,854 | 37,530 |

##### Slocan-Kootenay Shipments.

|             |       |        |
|-------------|-------|--------|
| Total ..... | 3,854 | 37,530 |
|-------------|-------|--------|

The total shipments for the past week were 38,098 tons and for the year to date 408,332 tons.

##### Granby Smelter Receipts.

###### Grand Forks, B.C.

|              |        |         |
|--------------|--------|---------|
| Granby ..... | 18,976 | 210,238 |
|--------------|--------|---------|

##### B. C. Copper Co.'s Receipts.

###### Greenwood, B.C.

|                   |       |        |
|-------------------|-------|--------|
| Mother Lode ..... | 8,610 | 88,480 |
| Other Mines ..... |       | 1,483  |
| Total .....       | 8,610 | 89,963 |

##### Consolidated Co.'s Receipts.

###### Trail, B.C.

|             |       |        |
|-------------|-------|--------|
| Total ..... | 6,936 | 68,936 |
|-------------|-------|--------|

##### Le Roi Smelter Receipts.

###### Northport, Wash.

|                   |     |        |
|-------------------|-----|--------|
| Le Roi .....      | 758 | 9,218  |
| Other Mines ..... | 181 | 3,403  |
| Total .....       | 939 | 12,621 |

The total smelter receipts for the past week were 35,461 tons and for the past year to date 381,758 tons.

The following are the ore shipments for the week ending March 27th, and year to date:

##### Boundary Shipments.

|                       |        |         |
|-----------------------|--------|---------|
| Snowshoe . . . 2..... | 2,733  | 25,655  |
| Mother Lode .....     | 8,116  | 96,596  |
| Granby .....          | 20,382 | 230,620 |
| Other Mines .....     |        | 1,563   |
| Total .....           | 31,231 | 354,433 |

##### Rossland Shipments.

|                            |       |        |
|----------------------------|-------|--------|
| Le Roi No. 2 .....         | 710   | 7,375  |
| Centre Star .....          | 3,928 | 32,853 |
| Le Roi No. 2, milled ..... | 260   | 7,960  |
| Other Mines .....          |       | 9,310  |
| Total .....                | 4,898 | 57,498 |

##### Slocan-Kootenay Shipments.

|             |       |        |
|-------------|-------|--------|
| Total ..... | 4,016 | 41,546 |
|-------------|-------|--------|

The total shipments for the past year were 40,145 tons and for the year to date 435,477 tons.

##### Granby Smelter Receipts.

###### Grand Forks, B.C.

|              |        |         |
|--------------|--------|---------|
| Granby ..... | 20,382 | 230,620 |
|--------------|--------|---------|

##### B. C. Copper Co.'s Receipts.

###### Greenwood, B.C.

|             |       |        |
|-------------|-------|--------|
| Total ..... | 8,116 | 98,079 |
|-------------|-------|--------|

##### Consolidated Co.'s Receipts.

###### Trail, B.C.

|             |       |        |
|-------------|-------|--------|
| Total ..... | 8,824 | 77,760 |
|-------------|-------|--------|

The total smelter receipts for the past week were 37,322 tons and for the year to date 419,080 tons.

##### Silver Prices.

|                | New York.<br>cents. | London.<br>pence. |
|----------------|---------------------|-------------------|
| March 20 ..... | 50 1/4              | 23 1/4            |
| " 22 .....     | 50 5/8              | 23 1/4            |
| " 23 .....     | 50 5/8              | 23 1/4            |
| " 24 .....     | 50 3/8              | 23 3-16           |
| " 25 .....     | 50 1/4              | 23 1/8            |
| " 26 .....     | 50 3/8              | 23 3-16           |
| " 27 .....     | 50 3/8              | 23 3-16           |
| " 29 .....     | 50 3/8              | 23 3-16           |
| " 30 .....     | 50 1/2              | 23 1/4            |
| " 31 .....     | 50 3/8              | 23 3-16           |
| April 1 .....  | 50 1/2              | 23 1/4            |
| " 2 .....      | 50 3/4              | 23 3/8            |

#### MARKET REPORTS.

April 2.—Connellsville coke, f.o.b., ovens:

Furnace coke, prompt, \$1.50 to \$1.60.

Foundry coke, prompt, \$2.00 to \$2.15.

##### Metals.

April 2.—Tin, Straits, 29.50 cents.

Copper, prime Lake, 13 cents.

Electrolytic copper, 12.65 to 12.75 cents.

Copper wire, 14.25 cents.

Lead, 4.10 cents.

Spelter, 4.85 cents.

Sheet zinc, 7.25 cents.

Antimony, Cookson's, 7.85 to 7.95 cents.

Aluminium, 22 to 24 cents.

Nickel, 40 to 47 cents.

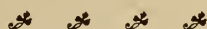
Platinum, \$22.50 to \$23.50 per ounce.

Bismuth, \$1.75 per lb.

Quicksilver, \$45.00 to \$46.00 per 75-lb. flask.



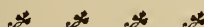
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If you see fit to use this letter as a testimonial, you will be doing the chicken fanciers a great benefit.

If any one wishes to see how the roofing lasts I will be pleased to have them visit my farm. Yours truly,

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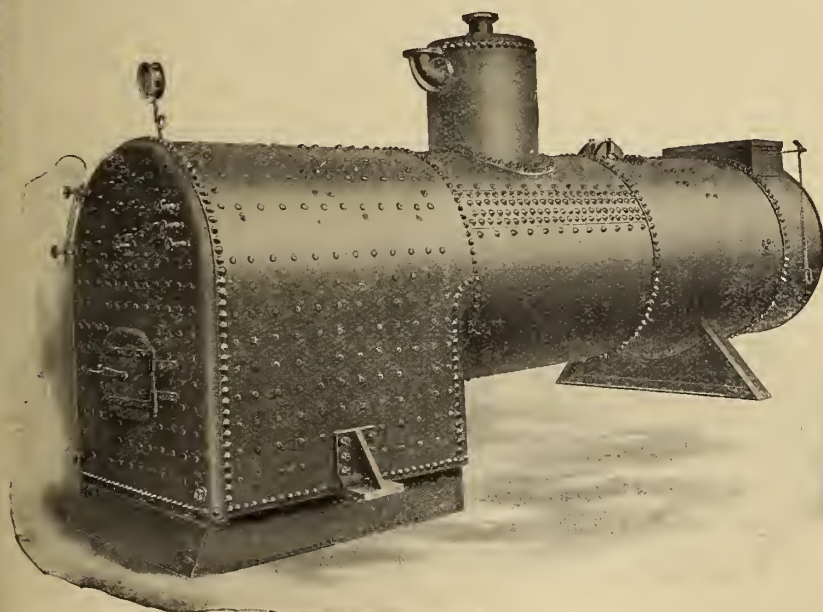
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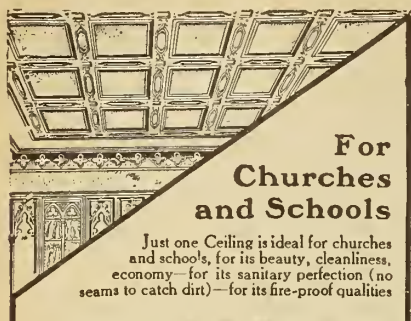
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The following are the subjects treated. General description of the Sydney coal fields: The mines of the Glace Bay Basin. The Phalen Seam. The Harbour Seam, The Emery Seam and lower seams of the Glace Bay Basin, The Lingan-Victoria areas, The fire-fighting organization and equipment, General and transportation. Every branch of work is illustrated and makes a splendid souvenir and and historical volume. MacLeod's Bookstores at Sydney and Glace Bay are the local selling agents, price \$1.00. The edition is limited all plates being destroyed.

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# PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

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| Evans, J. W.          |  | Hersey, Milton L. | Haggen, Edward A.    |
| Gwillim, J. C.        |  |                   |                      |
| Gillespie, G. H.      |  | Nova Scotia       | FOREIGN—New York     |
| Hassan, A. A.         |  | Brown E. Percy    | Hassan, A. A.        |

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|                                                                                                                                                                                                                                                                   |                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                  |
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## BRITISH COLUMBIA

## The Mineral Province of Canada

has produced to the end of 1906, \$68,721,103 of Placer Gold; \$41,015,697 of Lode Gold, \$25,586,008 of Silver; \$17,625,739 of Lead; \$35,546,578 of Copper; \$79,334,798 of Coal and Coke; and \$5,813,799 of Other Minerals; or a total of **\$273,643,722**. The Mineral Production of the Province for 1906 was

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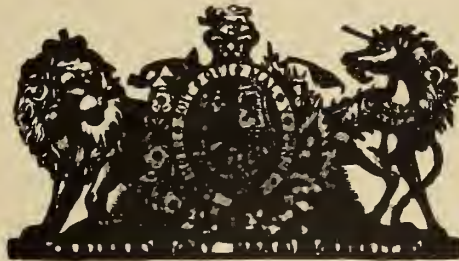
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OF CANADA

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**COAL**—Coal mining rights may be leased for a period of 21 years at an annual rental of \$1 per acre. Not more than 2,560 acres shall be leased to one individual or company. A royalty at the rate of five cents per ton shall be collected on the merchantable coal mined.

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The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year, or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey made, and upon complying with other requirements, purchase the land at \$1 per acre.

The patent provides for the payment of a royalty of 2½ per cent. on the sales.

Placer mining claims generally are 100 feet square; entry fee \$5, renewable yearly.

An applicant may obtain two leases to dredge for gold of five miles each for a term of twenty years, renewable at the discretion of the Minister of the Interior.

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles. Rental \$10 per annum for each mile of river leased. Royalty at the rate of 2½ per cent. collected on the output after it exceeds \$10,000.

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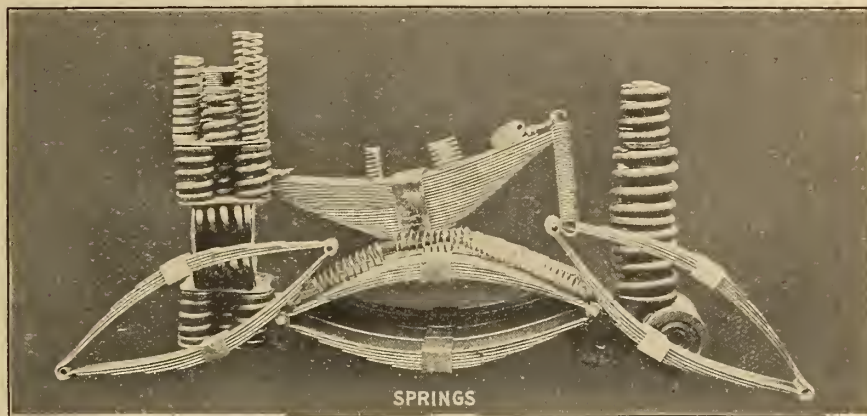
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INTERLOCKING PLANTS

TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

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"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

**BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND**

Quotations for Tee Rails, Fish Plates, etc., promptly furnished.

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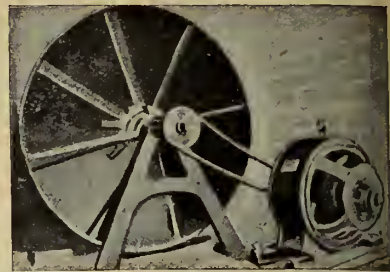
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A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

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Westinghouse Motor Driving Ventilating Fan.

**Electric Power has many  
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It is the most adaptable and easy controlled. Apparatus can be installed exactly where wanted and be operated from any convenient central point. Wires may be strung anywhere.

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922-923 Union Bank Bldg.,  
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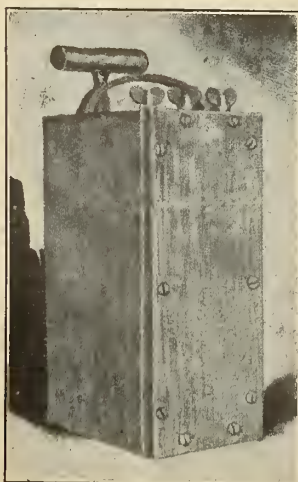
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Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

**High Explosives, Stumping Powder, Blasting and  
Sporting Powder, etc.**

**Safety Fuse, Electrical Fuses, Batteries, and other  
Accessories.**



Three Post Magneto Electric Blasting Machine

## NOBEL GELIGNITE A New High Explosive

It always breaks cleanly to the bottom of the drill holes.  
and is free from fumes of any kind,

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

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ARE

**"HARDY'S"**

INTERCHANGEABLE

**"Universal" Picks**

They cut more Coal in less Time than any others  
and last longer

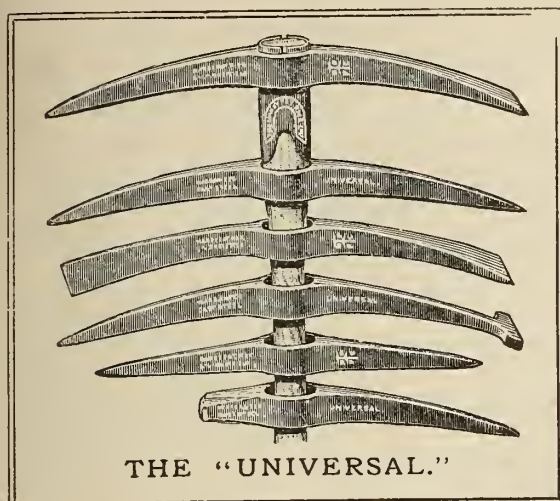
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**"ELLIOTT" & "RATCHET"**

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**BORING MACHINES**

For HAND POWER, for ROCK and COAL  
Fitted with Quick-Change Nuts and Automatic Feed



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Stocks of our Universal Picks and Headed Shafts kept by Messrs. Mussels Ltd.,  
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The **"CLEVELAND"**  
A One-Man Stope Drill

If you are doing any stoping or up raising it will pay you to use a "Cleveland." To prove this we will ship you an equipment complete so that you can prove to your own satisfaction that it

**SAVES TIME, LABOR,  
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We offer you a simple, durable, "fool-proof" machine which we will guarantee will do more work than any similar machine on the market at less cost for maintenance.

WRITE TODAY FOR BULLETIN NO. 40.

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ROCK DRILLS, PNEUMATIC TOOLS, HOSE, DRILL STEEL, ETC.

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### A 5 Electric Rotary Drill

for

Coal, Slate, Shale, Clay, Gypsum, Rock Salt, etc.

This machine can be absolutely depended upon to drill any material which can be penetrated by an auger bit.

Bulletin X 16

Contains illustrations and complete data. Mailed on request.

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### Complete Coal Mine and Tipple Equipments including

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**THE JEFFREY MFG. CO., Columbus, O, U.S.A.**

Canadian Office and Works: - **MONTREAL.**



Sullivan "D-21" Hammer Drill in operation

## Sullivan Hammer Drills

are the most economical hammer drills to buy because they excel in **speed** and in **durability**.

The cost of power, labor and repairs per foot drilled with Sullivan machines is lower than that secured with other types.

All features of design, and all processes of manufacture, have been adopted only after thorough demonstration that each is **the** one which will contribute most to the speed of the drill or to its power of resisting wear and tear.

"D-21" air feed drills for stoping and raising.

"D-15" and "D-19" hand feed drills for block holing and trimming.

Details in Bulletin 660-A

**ROCK DRILLS - AIR COMPRESSORS - HOISTS  
COAL CUTTERS**

## Sullivan Machinery Co.

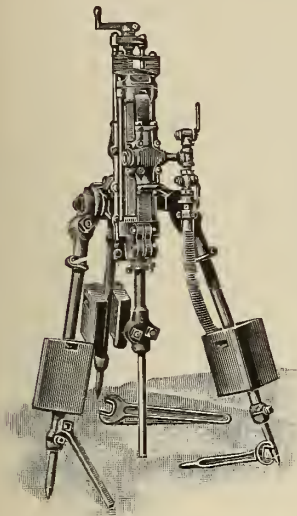
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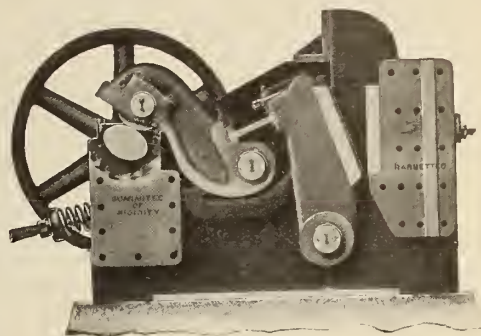
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STURTEVANT MILL CO'S  
Crushing, Grinding,  
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Head Office: TORONTO, Branches: MONTREAL, WINNIPEG, VANCOUVER.

Manufacturers, Importers, and Dealers in all kinds of Engines, Boilers, Machinery and Supplies.



# RAND

"Little Giant"

## Rock Drills

☐ Built in sizes ranging from 2" to 5½" Cylinder diameter, for all work from boulder breaking to submarine drilling.

☐ Our claim that the Rand drill is the best in the market is proven by the sale of more of this type than of all other makes combined.

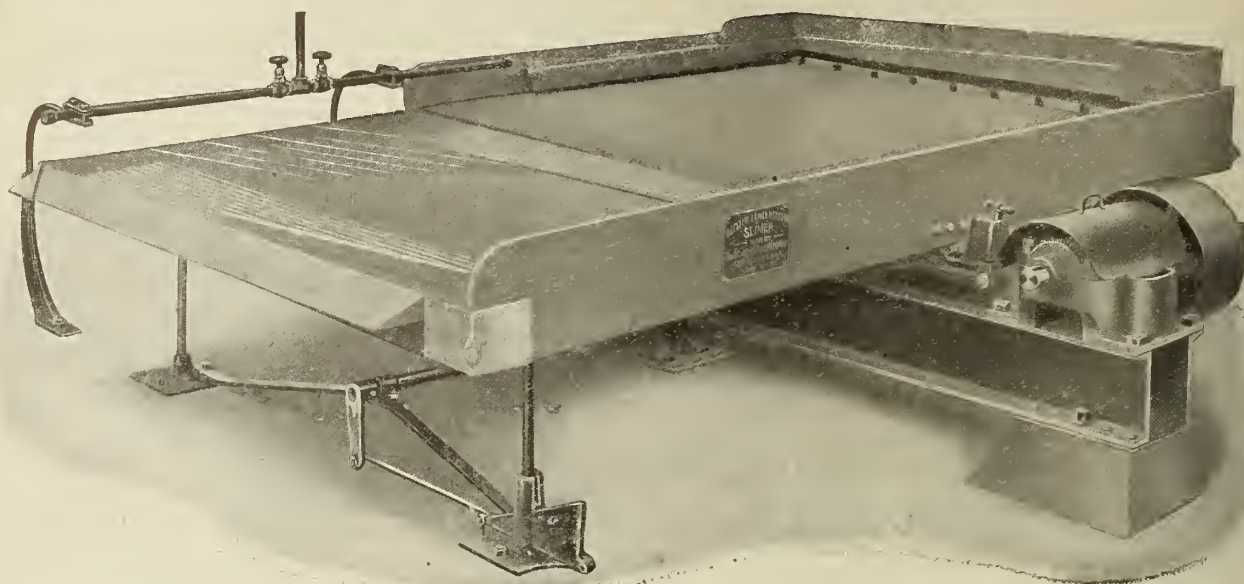
☐ Prices and catalog on request, or ask to have one of our representatives call.

## CANADIAN RAND CO., LIMITED

Montreal, Canada

TORONTO, COBALT, HALIFAX, WINNIPEG, ROSSLAND, MONTREAL.

# The No. 3 Deister Slime Table



The greatest advance in slime concentration attained in recent years has been accomplished by this table. Its success is emphasized by the fact that as the result of an elaborate competitive test with vanners of various makes **70 of these Tables are now in operation in the new mill of the Goldfield Consolidated Mines Co., Goldfield, Nevada**

This should draw the attention of all mill men. Send for Nos. 1, 2, and 3 Catalogues.

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and the exact amount payable in **Austria, Belgium, Denmark, France, Germany, Great Britain, Holland, Italy, Norway, Russia, Sweden and Switzerland** is stated on the face of each cheque, while in other countries they are payable at current rates.

The cheques and all information regarding them may be obtained at every office of the Bank.

Branches at **Cobalt, Elk Lake, Cowganda, and Latchford** in the silver mining camp of New Ontario and throughout Canada; also in the United States and England.

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Chemical and Physical tests  
of all Materials.

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Mining properties examined  
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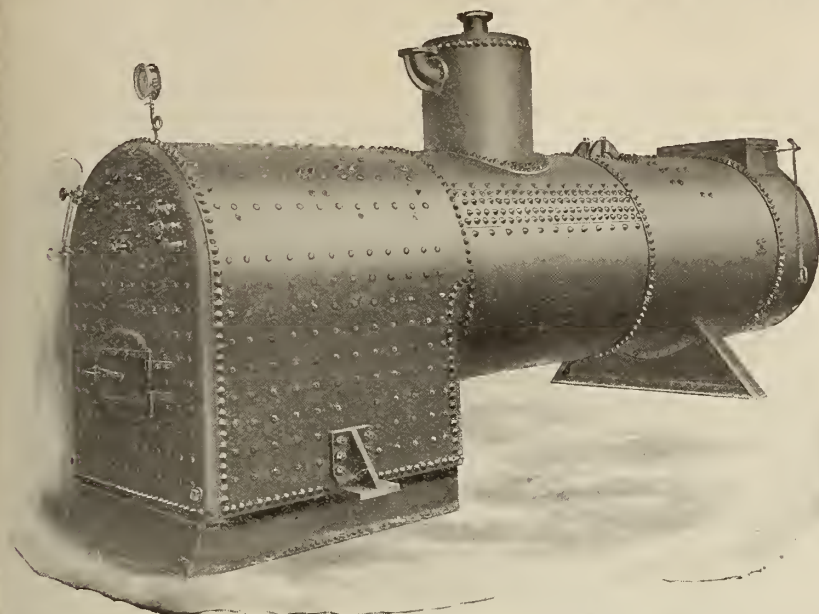
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Locomotive Portable  
Clyde Marine  
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ASK FOR OUR LIST OF  
BOILERS ON STOCK WITH  
PRICES

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GALT, - ONTARIO, - CANADA

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## Locomotive and Stationary Tubular Boilers

IN STOCK—FOR IMMEDIATE SHIPMENT

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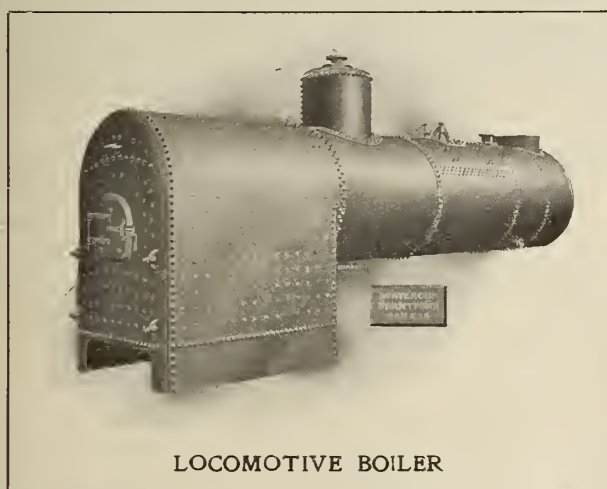
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### TUBULAR BOILERS

72" x 18"—66" x 16"—60" x 14"—48" x 14"

**1 HOISTING ENGINE**, double cylinder, double drum, only used two weeks, thoroughly overhauled, cheap.

**SHEET IRON and TANK WORK, AIR RECEIVERS, HEATERS, ENGINES, ROCK CRUSHERS, Etc.**



LOCOMOTIVE BOILER

Inquiries Solicited.

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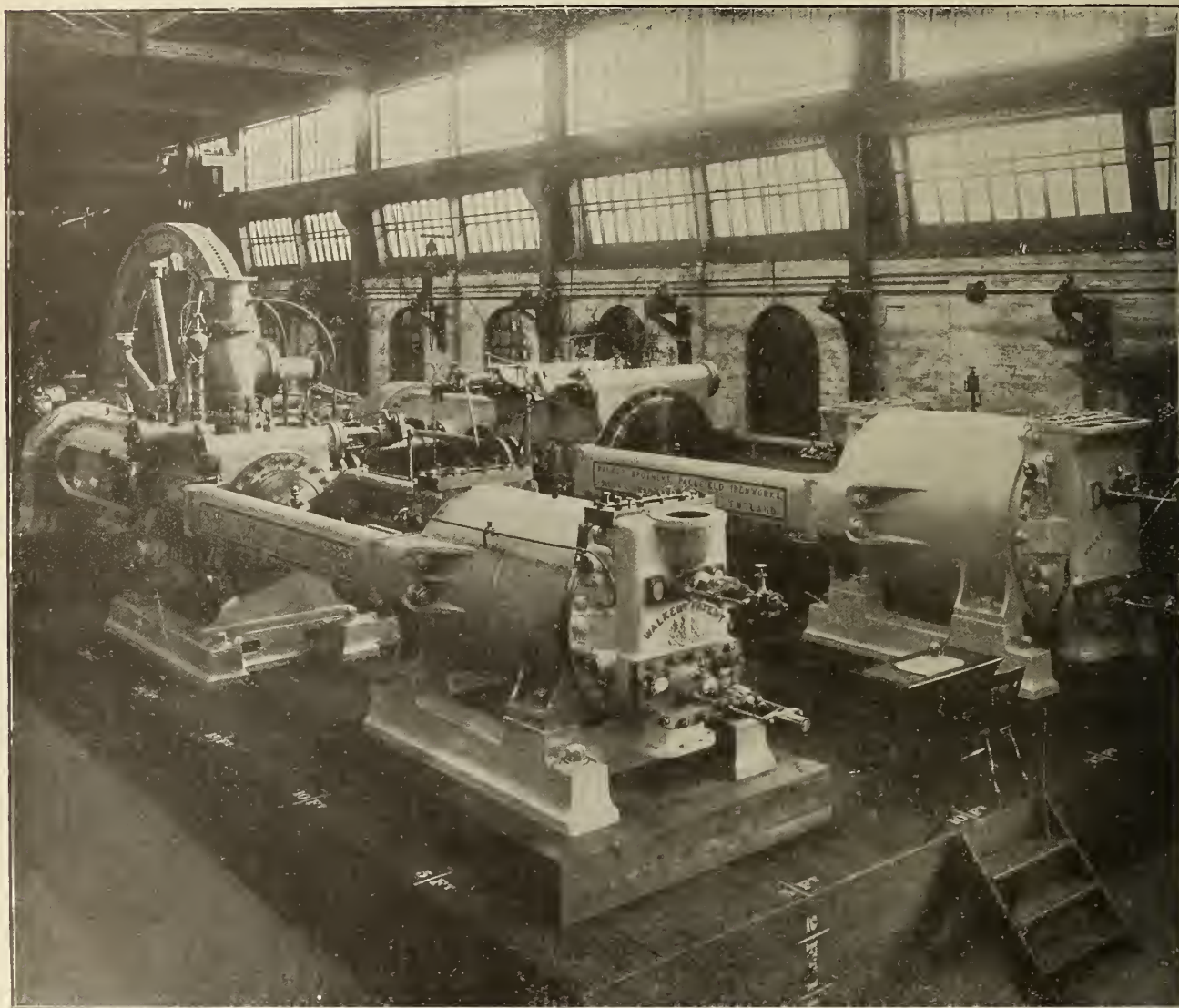
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## Wigan, England



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are of **WALKER BROTHERS (Wigan) LIMITED** manufacture.

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# PEACOCK BROTHERS

CANADA LIFE BUILDING,  
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Manufacturers of  
**CRUSHING AND GRINDING MACHINERY**  
of every description.

## HADFIELD'S Patent "ERA" MANGANESE STEEL

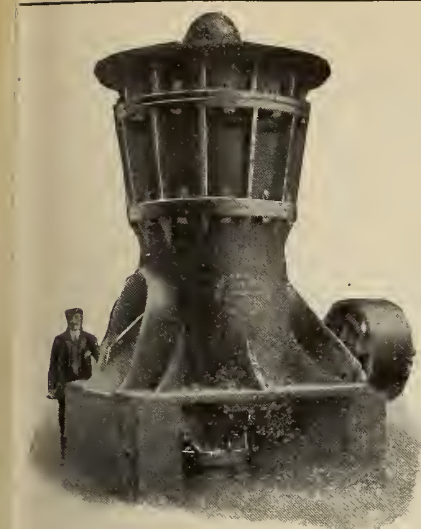
is used for all the wearing parts. This steel is the supreme material for  
Tramway Track-work and parts of machinery subject to great abrasive strain.

## Steel Castings for Collieries, Mines, etc.,

Including  
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,  
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

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Heclon Rock and Ore Breaker. Hadfield & Jack's Patent.

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OUR SPECIAL AIM:

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ALL PURPOSES

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**Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.**

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

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**NEW GLASGOW, NOVA SCOTIA**

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**Engines, Air Compressors**

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Consulting and Contracting Engineers

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We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., \$400 to \$10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

**Standard Diamond Drill Co.**

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Have you ever said this to yourself and the nearest assay office 100 miles away?

Then you can appreciate Way's Pocket Smelters. You can test your ore in your office or in the field and KNOW what metal it contains, and at a cost of only 5c. Simple in construction and easy to operate.

If you are a prospector or a mining man, you need one of our outfits. Let us send you our Illustrated Pamphlet telling of its many uses.

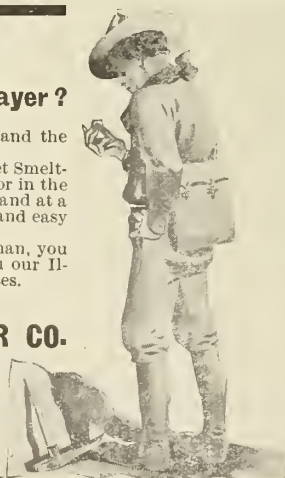
Write today. It will pay.

**WAY'S POCKET SMELTER CO.**

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Sold by Dealers Everywhere.



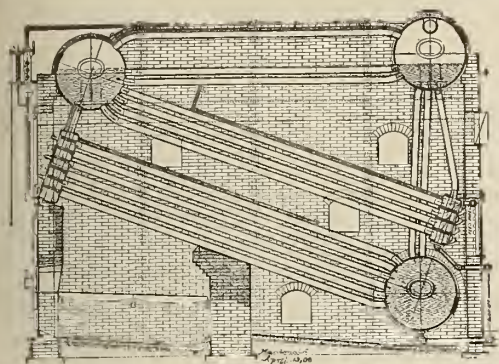
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Free expansion of tubes. Perfect water circulation. Dry or superheated steam. Half the usual number of handholes.

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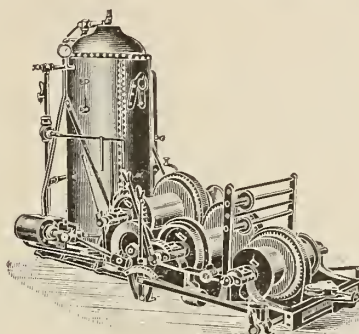
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Mine Hoists,  
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Steel Skips, Coal and Concrete Tubs,  
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Agents :

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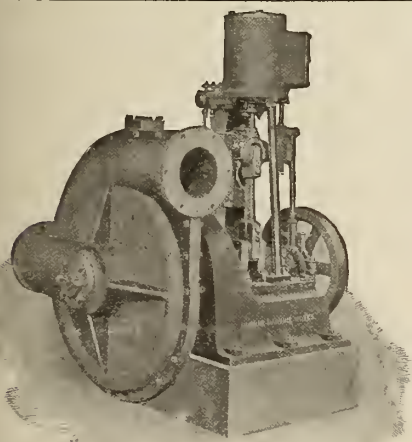
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TURNTABLES, ROOF TRUSSES  
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Structural METAL WORK of all kinds

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Centrifugal Pumping Machinery for various Industrial Purposes

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## STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

The FLORY CABLEWAY SYSTEM is Superior to any on the Market

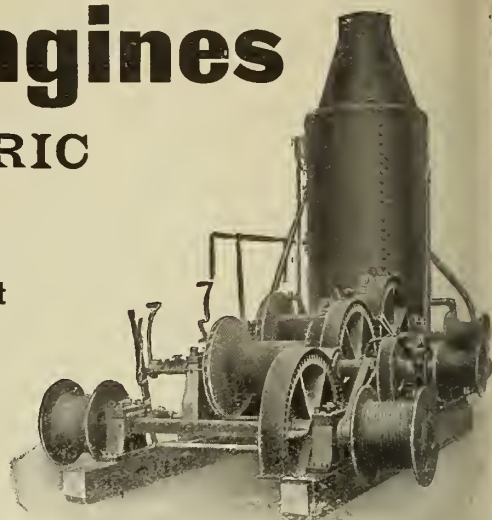
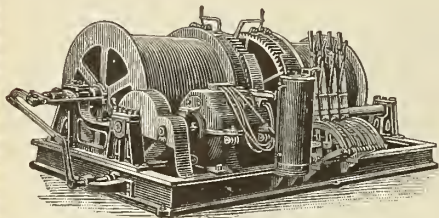
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MAY PROVE THE SOLUTION.

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All types and sizes. Complete outfits. Write for catalogue

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Experienced Travellers  
==prefer the==

## Canadian Pacific Railway

for its excellent equipment. All are pleased with the bright, modern coaches; the exceptionally roomy berths in the sleeping cars; superior dining car service, etc.

The "good cars" bring the C. P.R. hundreds of passengers every week.

All equipment is built in the Angus Shops at Montreal from the most modern designs, embodying every improvement known to practical railroading.

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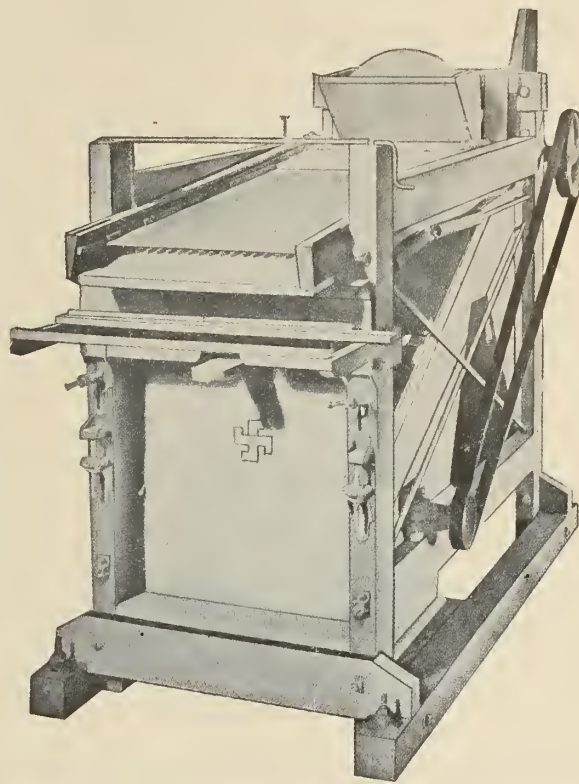
The system embraces both dry and wet features and we are prepared to treat all ores.

On Graphite, Molybdenite, Chalcopryrite and other difficult ores tailings and slimes practically ALL the values can be recovered.

A completely equipped plant, including concentrators, crushers, rolls, etc. for testing purposes is located at address below.

Write us for descriptive pamphlet. Forward sample of your ore for preliminary test.

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Write for particulars and prices.

**United Typewriter Co., Ltd.**  
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**JACQUES BASZANGER & CO.,**  
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Importers of  
**Carbons**  
(Black Diamonds) for Diamond Drills



Largest carbon ever found.  $\frac{1}{4}$  actual size.

NOTE. We personally break (in this country) our carbons, thereby enabling us to determine accurately their quality. We deal only in very best quality and are always ready to ship goods on approval and for selection to responsible parties. Write us.

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**JUTE COTTON  
DUCK**

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ASBESTOS COAL ORE  
CONCENTRATES  
FLOUR GRAIN FEED

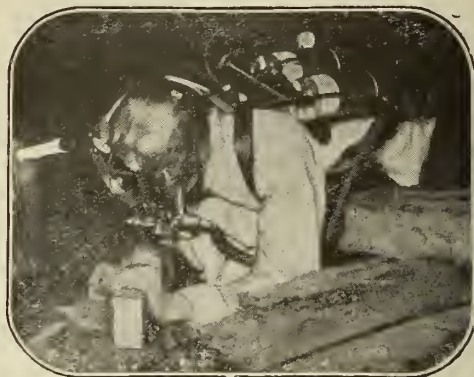
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**The Canadian Bag Company, Limited,**  
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## Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.

To Date **34** Lives Saved by Its Use



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**LIGHT and AIR**

The latest model, Helmet fitted with Electric Head Light.

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All Sizes and to any Pressure

**Iron and Steel Boiler Tubes**

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Full stock always on hand.

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For Stationary, Marine and Locomotive Boilers

**Pressed Steel Floor Plates**

Raised Diamond and Ribbed Pattern

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Retarding Conveyor at Gentry, W. Va.,  
Mine of N. R. & P. C. C. & C. Co.,  
Capacity, 500 tons per hour.

Great Capacity  
Rugged Construc-  
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Few Repairs

Conveyors for every  
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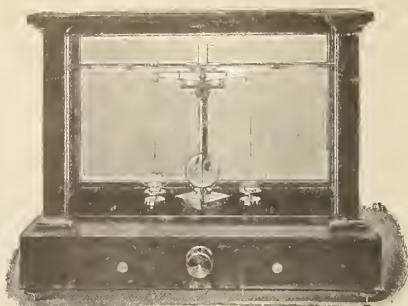
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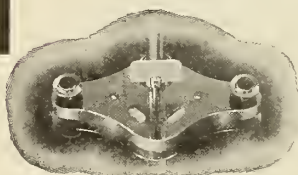
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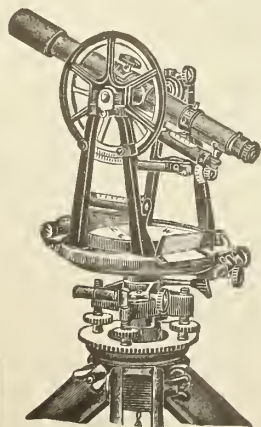
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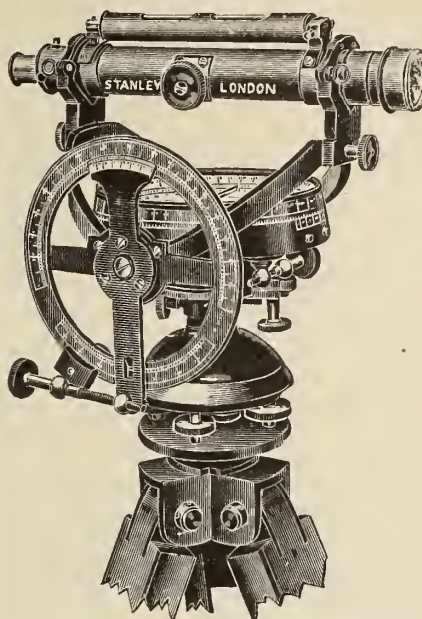
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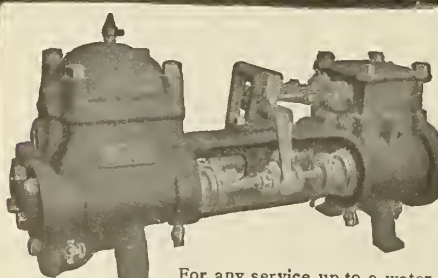
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, May 1, 1909

No. 9

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

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Advertising copy should reach the Toronto Office by the 8th, the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

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### AN ENGLISH ENGINEER'S ADVICE.

Under date of January 11th, 1909, Mr. William Frecheville, whose name is familiar to all Canadian mining men, wrote a letter of thanks to the Secretary of the Canadian Mining Institute. Summing up the impressions that he received during last summer's excursion, Mr. Frecheville emphasizes his opinion that large expansion is in store for the Canadian mining industry, both in established enterprises and in new fields.

To account for the small participation of English capital in Canadian mining, Mr. Frecheville cites the following reasons:—"Firstly, the results obtained by enterprises launched in England to work mines in Canada have not, as a rule, been encouraging. Secondly, the distance from the Canadian and American centres of capital to the Canadian mines is so much less than the distance from England, that the enterprising and alert Canadian or American gets there before the man from over the water has even a look in."

It would have brought out the truth more fully had Mr. Frecheville added that "the enterprising and alert Canadian or American" is not to be blamed for the undoubted lack of success on the part of English investors. English investments have been unsuccessful mainly because they have been blunderingly conducted. Instance after instance has occurred where capitalists from the Motherland have proved easy victims for promoters discredited in Canada. Time and again good British guineas have been squandered by a wasteful and incompetent management. Neither Canada nor Canadians can be blamed for this. The English investor needs, above all else, experienced and responsible mining engineers to guide him; men, indeed, of Mr. Frecheville's class.

"As matters now stand," concludes Mr. Frecheville, "the best procedure for English capitalists who contemplate interesting themselves in mines in Canada, would seem to be to have a resident agent there, who would keep them in touch with what is going on, . . . otherwise I am afraid that history will repeat itself, and what is brought over to London will by no means be 'the pick of the basket.'" Continuing, he recommends that only prospects that are at least promisingly developed, or mines already proved payable, be brought to the attention of London capitalists.

The general tone of Mr. Frecheville's letter is distinctly appreciative of Canadian mining. His good opinion counts for not a little, and his advice, simply and directly expressed, is worth more than pages of superlatives.

### GRAPHITE CONCENTRATION.

Mr. H. P. H. Brumell has for years constituted himself the champion of Canadian graphite. A long and discouraging fight was necessary before the Canadian product was granted a place on the world's markets. Also the problems that surrounded the separation of this mineral from its gangue were peculiarly difficult. To removing both the commercial and the technical obstacles Mr. Brumell has given his undivided attention. His paper, appearing on other pages of this issue, gives the reader a brief view of the history of the graphite industry in Quebec and Ontario, with especial reference to ore treatment.

The disseminated graphite ores of Labelle County, Quebec, and of Renfrew and Lanark, Ontario, are essentially graphite schists, in which quartz and feldspar predominate largely over other minerals. The small difference that exists between the specific gravities of these two minerals and that of graphite gives but little leeway for mechanical separation. Wet concentration formerly obtained altogether. The old stationary buddles, following wet stamping, gave a concentrate assaying 60 per cent., from a 10 per cent. ore. Among other devices, the Brumell separator replaced the buddles. Next the concentrates from the Brumell separator were dried and treated on Hooper tables. Now, at the mill of the Buckingham Graphite Company, the whole system is one of dry concentration.

Mr. Brumell characterizes this mill as being, to the best of his belief, the only one producing graphite commercially from disseminated ore. He further states that in such a plant ore carrying about 12 per cent. of graphite is concentrated up to from 75 to 86 per cent., and the concentrates finished to stocks assaying from 70 per cent. to 96.5 per cent.

The paper, "Graphite Concentration," is a worthy contribution to the literature published by the Canadian Mining Institute.

### THE COAL AND IRON-ORE SUPPLIES OF THE UNITED STATES.

Utilizing all available statistics and data, competent specialists have calculated that all the easily accessible coal known to exist in the United States will be exhausted by the middle of next century. The supply of high-grade iron ores now available will diminish to the vanishing point before 1950.

These statements, if even approximately correct, carry a tremendous lesson. Canada's iron ore resources are hardly touched. Her coal supplies, especially in the West, are sufficient for many decades. Yet neither commodity exists in exhaustless quantity. Canada will probably reach the highest development when our neighbour's annual outputs shall have begun to decrease. It is inevitable that we shall be called upon to supply both iron ore and coal for the greater part of

the continent. We shall be a richer and a greater people if, instead of crude iron ore, we sell iron and steel. To this end we must, to some extent at least provide for retaining control of our fuel resources.

The thought that Canada, through her mineral industries, must ultimately dominate the continent savours of arrogance—so not seldom does destiny.

### AN INVALUABLE INDEX.

The public has long been indebted to the American Institute of Mining Engineers for enriching the literature of mining with large numbers of monographs, essays, scientific discussions and descriptive papers of all kinds. These assume permanent form in the shape of large and costly annual volumes. Not many persons are lucky enough to possess, or to be able to purchase a complete set of these volumes. They are accessible however, in numerous public and reference libraries.

Scattered throughout these volumes are numberless special papers, allusions to processes, and all manner of material that is occasionally of vital interest to individuals.

Lately the Institute has published a General Alphabetical and Analytical Index, covering all the Transactions from Volume I. (1871) to Volume XXXV. (1904). The labour and expense entailed in compiling this 700 page index must have been enormous. The end justifies the time and expenditure lavished upon it.

To those who own sets of the Transactions, the Index opens up every page, and saves an infinity of time. For those who do not possess the annual volumes, the Index is the only possible substitute.

### IMPERIAL FEDERATION.

Seeking the co-operation of sister societies in Australia, Canada, and South Africa, the Institution of Mining and Metallurgy resolved to invite the President of these respective bodies to accept, ex officio, election as Honorary Members and Corresponding Members of Council of the Institution. The invitation was extended to the Australasian Institute of Mining Engineers, the Canadian Mining Institute, and the Chemical, Metallurgical and Mining Society of South Africa. It was readily accepted.

It may be noted that Corresponding Members of Council have the privilege of attending and voting at Council meetings.

This federation, loose though it may be, is certain to produce beneficent results. Membership in the Institution of Mining and Metallurgy gives definitive and honourable standing. Closer connection between the mining societies of the four principal sections of the British Empire will brighten and benefit each and all.

To us this seems to be the healthiest combination of Imperial sentiment and Imperial brains.



### THE LIFE OF A MINE.

There are several vital questions touched upon in a paper that appears in this issue, "The Valuation of Mining Areas on the Rand." The writer characterizes the practice of working rich reefs and poor reefs together on average grade as being financially unsound. To get the highest value out of a mine, it is necessary, in his opinion, that the grade in the early part of the mine's life should be higher than in the later years. This should be done, theoretically at least, in such a manner as to reserve the lower grade ore for future operations. In many mines such a course is impossible, but the principle has much to commend it. Mr. Wilkinson's paper should be read carefully.

It is unfair to isolate paragraphs from their context. Therefore we shall not quote farther. But we wish to direct particular attention to Mr. Wilkinson's remarks on the most profitable life of a mine.

### SAMPLES—NOT SPECIMENS.

A departure has been made in arranging the mineral exhibits at the Alaska-Yukon-Pacific Exposition which is shortly to open at Seattle. Heretofore it has been the custom to exhibit the finest picked specimens; a misleading and unconsciously dishonest proceeding. At the Seattle Exposition samples of from one hundred to four hundred pounds of ore will be displayed. Only legitimate mining concerns will be asked or permitted to exhibit. Along with each parcel of ore will be seen samples from the vein walls.

We hope that this will ring the knell of the spectacularly fine ore exhibit that represents, not the average ore of any mine, but the carefully hand picked specimen. Specimens are interesting enough mineralogically; but commercially they are mischievous.

### NOVA SCOTIA'S GOLD MINES.

In our last issue we published without comment a communication from Mr. T. A. Rickard, editor of Mining and Scientific Press. Mr. Rickard has taken exception to the attitude of the Government of Nova Scotia in regard to a special report written by him in 1905. Although written at the request of the Government,

this report has never been made public. In Mr. Rickard's opinion, this has done him an injustice.

More light is thrown on the subject in this number of the Canadian Mining Journal. We hope that our readers will follow the discussion closely. There are usually two sides to every question. Our own opinions will not be expressed until the matter is more fully threshed out.

### EDITORIAL NOTES.

An especially complete and excellent map of Rossland has just been issued by the Geological Survey of Canada. Director R. W. Brock is responsible for the economic geology, Dr. G. A. Young for the areal geology, and Mr. W. H. Boyd for the topography. The geological and cultural legends are particularly perfect.

The Geological Survey of Canada has also issued a geological map of Gowganda Mining District, the work of Mr. W. H. Collins. The diabase, conglomerate, granite, and Keewatin areas are approximately delimited. The geology, and there necessarily is but a scanty amount, has been worked out by Mr. Collins and Dr. W. G. Miller.

The mines of the Slocan district, British Columbia, have in the past made total dividend payments amounting to over four and one-quarter million dollars. The old Payne holds the local record—\$1,420,000. Next comes the Slocan Star, with \$575,000 to its credit. Six other mines have distributed total dividends ranging from \$400,000 to \$125,000. The district is attracting renewed attention this spring.

The Hon. Robert Drummond, in a speech before the Legislature of Nova Scotia, advocated the appointment of a Provincial Geologist. We heartily endorse this suggestion. Until such an official is appointed, Nova Scotia's mining administration will continue to be incomplete. The further recommendation, that the Government erect public stamp mills for the benefit of small operators, is sanctioned by usage in Australia and otherwheres.

## MINING AROUND KASLO, BRITISH COLUMBIA.

By E. Jacobs, Victoria, B.C.

Kaslo is the most important town in Ainsworth mining division, in which are situated a number of productive mines. It is on the west side Kootenay Lake, where Kaslo River enters the lake, and is the shipping terminus of the Kaslo-Slocan Railway.

Ainsworth was the pioneer mining district of West Kootenay, for, in 1889, the late Dr. George M. Dawson found mining being actively carried on at Ainsworth or "Hot Springs," as it was also called in earlier

years), which is situated a few miles lower down the lake than Kaslo.

Early accounts state that about 1890 hardy prospectors pushed their way up Kaslo River as far as Bear and Fish Lakes, on the summit of the divide, and searched for minerals on the adjacent mountain sides. In that year mineral claims were located by John (Lardo) McDonald and John Allen, who were hunting and trapping on what was known as Blue Ridge Creek,



ten miles west of Kaslo, but little was known of the value of these claims until after they had been visited in August, 1891, by Andrew Jardine, who returned to Ainsworth with samples of ore which assayed up to 171 oz. per ton in silver. Following this many prospectors examined the hills of the Kaslo slope, and passed thence over the divide to the Slocan slope where, on September 2nd, the Payne was located by John L. Seaton and Eli Carpenter. The finding of high grade silver ore here resulted in a genuine, old-fashioned mining stampede.

In his "West Kootenay Reminiscences," Mr. G. O. Buchanan, now and for years a resident at Kaslo, mentioned the plotting of Kaslo townsite in 1891, the forcing in to the heart of Slocan of wagon roads from Kaslo and Nakusp "by monumental energy;" the taking out to Tacoma of 10 tons of ore from the Dardenelles mine by Mr. E. E. Coy, who "brought back \$5,000 in gold coin;" the finding of "a big boulder containing 100 tons of galena," and the building, in 1895, of the Kaslo and Slocan Railway, this "giving an easy outlet to Kootenay Lake."

Coming down to the present, the following summary, while necessarily omitting records of much ma-

of California (father of the present owner of the Hearst newspapers) erected a small open-hearth furnace on the property and reduced some of the ore to bullion, but the low grade of the product and the difficulties of marketing it led him to abandon his enterprise. As the years passed it had other owners, including the Ainsworths, of Portland, Oregon. In the nineties it passed into the possession of Dr. W. Hendryx and his associates—Minnesota and Connecticut capitalists—who developed the mine and erected smelting works at Pilot Bay, eight miles lower down the lake. Failure followed, and for years the mine and smelter were held by the Bank of Montreal, until, in 1895, they were purchased by the Canadian Metal Company. Since then development, on a fairly large scale has been carried out, and ore, estimated at 300,000 tons, has been made available for stoping. Last year the erection and equipment of 200-ton concentrating mill was completed. During the latter half of the year approximately 18,000 tons of ore were milled and the product, some 2,200 tons of lead concentrate, was shipped to the smelter at Trail. The mill, which was designed by Mr. S. S. Fowler, general manager of the Canadian Metal Company, continues to do effective and economical



Bird's-eye View of Kaslo, B.C.—Distributing Centre of the Slocan.

terial progress and considerable productiveness during the years that have intervened since shipment of silver and lead ores in large quantity was commenced, will give some information of the progress made to date and present conditions.

The larger mines of Ainsworth mining division now producing ore are the Blue Bell, Cork, Whitewater and Deep, Lucky Jim, and Rambler-Cariboo. The mines of Ainsworth camp proper will not be included in this summary.

#### The Blue Bell.

While not on the Kaslo slope of the Slocan, the Blue Bell is in Ainsworth division, across the lake from and a few miles south of Kaslo.

This mine possesses historic interest in British Columbia. The big mineral outcrop was discovered in 1825 by David Douglas, a Scottish botanist, who, in that year, was engaged in making an examination of the flora and fauna in the vicinity of Kootenay Lake. Hudson's Bay Company men afterwards obtained lead here for bullets for their rifles. In 1864 George Hearst,

work, and the production of zinc, as well as lead, concentrate has been provided for. It is stated that notwithstanding the small silver content of the ore and the low price of lead, the mine and mill are being operated at a satisfactory profit.

#### South Fork of Kaslo Creek.

This part of the Kaslo district is reached by the Kaslo and Slocan Railway and thence by a good wagon road.

Among the mines on this creek, which have for years been ore shippers, and on which much development work has been done, are the Cork, Province, Montezuma, and Bismark. Other properties are the Revenue, Flint, Index, Black Fox, Bell group, Gibson, Silver Bell, Nome, Sturgis group, Pbs, St. Francis and Vera.

The Province and Montezuma were operated together by Kaslo men for a while, until last year, when a fire destroyed the Montezuma concentrator and lower terminal of its aerial tramway. Afterwards Nelson



men, well known in the Slocan as experienced mine operators, leased the Province mine, and further developed it by extending the tunnel from the adjoining Cork mine and raising 125 ft. in ore. The ore taken out was put through the Cork concentrator. Work was suspended for the winter, but this season 20 to 25 men will be employed in mine and mill. More de-

velopment work will also be done on the Cork property, which is owned by a French company.

These mines, the largest in Whitewater camp, are being worked under lease by J. L. Retallack, S. S. Fowler, and W. E. Koch, all well-known men who have been operating in Slocan district for years. White-

water camp is connected with Kaslo by railway, and last year the combined output of the Whitewater and Deep mines was about 2,300 tons of lead-silver concentrate and 8,000 tons zinc. Of the latter some 3,000 tons was made in 1907 and stored awaiting a suitable market. After a very successful year in 1908, the lessees arranged for work on a more extended scale in



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The Gold Commissioner for the Ainsworth and Slocan districts has his office at Kaslo. His jurisdiction extends north for some distance beyond Kootenay Lake, including the country known as the Duncan slope, in which direction important mining developments are expected to take place ere long, particularly on the Wagner group (recently bonded to Spokane, Washington, capitalists), and other promising properties in its vicinity on which ore bodes have also been discovered.

column headed "Amount," and the folio on which the personal account appears in the Ledger in the folio column of the amount of the invoice is entered in the debit column showing the proper heading, which must



the same as the Ledger Account chargeable with that particular expenditure. At the end of each month, the debit columns are all totalled, the total of each column being posted to the debit of the proper Purchase Account or Expense Account in the Ledger. The sum of all the debits, obtained by cross addition of the totals posted, must equal the total of the amount column. The invoices entered should be numbered consecutively and filed in the same order, and not as is very commonly done, filed under the companies'

names. The number of debit columns may be very large, some Purchase Journals having a separate debit column for every working account in the Ledger.

The Sales Journal, unlike the Purchase Journal, has the debit columns on the left hand side, and the credit column on the right hand side.

The following is a simple form of a Sales Journal for a Cobalt silver mine. For use at other mines, the headings of the Credit column will have to be changed to suit the character of the product :

## Sales Journal

[illegible]

The name of the purchaser and the amount are entered in their proper columns and each item is posted to the debit of the personal account in the Ledger. The corresponding amount is placed in one of the credit columns and at the end of the month the totals of the credit columns are posted to the credit of the different Sales Accounts, Silver Sales, Cobalt Sales, etc. The total of the credit postings must equal the total of the debit columns each month.

The General Journal is for all items that do not find their way into any of the other books. All cash transactions are taken care of in the Cash Book, all bills in the Bill Book, all incoming invoices in the Purchase Journal, and all outgoing invoices in the Sales Journal. Adjustments between accounts, opening and closing entries, sales of plant and stores, are all recorded in the General Journal.

At the end of the year inventories of stores, stationery, charges paid in advance, accrued charges, ore on hand, etc., are taken under careful supervision, all money values being at cost price. The accounts charged during the year with the purchases of any class of goods, is credited at the end of the year with the inventory of those goods on hand. The ore on hand is credited to the Sales Account. A new account is opened called "Inventory Account" to receive the debit for the total stock on hand. These entries are, of course, made through the General Journal.

After all adjustments have been made for the inventories the nominal accounts are all closed for the year into the "Profit and Loss Account." The form or making up this account differs with nearly every company. I would suggest a form as below; but it is almost impossible to make a hard and fast rule to follow in the formation of this account. However, I think some effort should be made to draw up a standard form showing the main features common to all. Blank spaces could be left to contain any additional items which the company insisted on showing in the Profit

and Loss Account. The same may be said of "Balance Sheets."

PROFIT AND LOSS ACCOUNT FOR YEAR  
ENDED.....

## CHARGES.

|                           |  |
|---------------------------|--|
| Mining Charges:           |  |
| Operating,                |  |
| Repairs,                  |  |
| General.                  |  |
| Milling Charges:          |  |
| Operating,                |  |
| Repairs,                  |  |
| General.                  |  |
| Ore in transit last year: |  |
| Sampling and Assaying,    |  |
| Sundry and Selling        |  |
| Expenses.                 |  |
| Depreciation,             |  |
| Profit from Operation.    |  |

Development,  
Management Expenses,  
Net Profit available for  
dividends,

Dividends,  
Balance undivided profits.

## EARNINGS.

Shipments of Ore.  
Less freight, etc.  
Mill Sales,  
Less freight, etc.  
Ore in transit this year.  
Royalties,  
Sundry Sales  
(Power, etc.)

Profit from Operation,  
Sundry items of revenue.

Net Profit.

In the Balance Sheet are shown all the Real and Personal Accounts, the latter class being shown in two items, namely, "Accounts Receivable" and "Accounts Payable." Below is shown a good form for the prep-

aration of the Balance Sheet designed to show as clearly as possible the actual state of affairs.

#### BALANCE SHEET.

| ASSETS.                        | LIABILITIES.                     |
|--------------------------------|----------------------------------|
| Permanent.                     | To the Shareholders,             |
| Cost of Property,              | Paid up Capital,                 |
| “ “ Buildings,                 | Undivided Profits,               |
| “ “ Plant,                     | From last year,                  |
| “ “ Furniture Fix-<br>tures,   | “ this year.                     |
|                                | Reserves for deprecia-<br>tions. |
| Floating,                      | To others,                       |
| Ore in transit,                | Bills Payable,                   |
| Inventory,                     | Accounts Payable,                |
| Accounts Receivable,           | Accrued Charges.                 |
| Stock in other Com-<br>panies, |                                  |
| Cash on hand,                  |                                  |
| “ in bank,                     |                                  |

#### SUB-MARINE COAL MINING IN NOVA SCOTIA.

The question of sub-marine coal mining was legislated upon about thirty-two years ago by the Nova Scotian Government. Mr. H. S. Poole, then Chief Inspector of Mines for the Province, formulated the regulations which now are comprised under Section 54 of the Coal Mines Regulation Act. Mr. Foster, an English coal specialist, reported recently upon this section of the Act. He pointed out that the lapse of time has provided much additional experience and has brought about some changes of views. Hence, in some respects, the present regulations might be improved.

For instance, Sub-section (1) a, provides that no undersea workings shall be carried on with a less depth than 180 feet of solid cover. The lessee may, however, drive passage-ways for the purpose of mining the deposit only, under a cover of not less than 100 feet. Commenting upon this, Mr. Foster remarks that, having regard to the general nature of the beds overlying the seams in the districts adjoining the seaboard in Nova Scotia, it would not be advisable to alter this regulation. The exact thickness of the solid measures cannot be ascertained accurately in any case. Hence a considerable margin of safety should be provided.

Sub-section (1) b, provides that “a barrier of not less than 50 yards, 25 yards on both sides of the boundary lines of every lease, shall be left unwrought be-

tween the workings of each submarine seam.” The same regulation, more clearly expressed, appears Section 208, of “The Mines Act,” 1892. A clause the latter provides that a barrier of 25 yards is to left “within and along each of the boundary lines” any sub-marine lease. Mr. Foster recommends that this phrasing be substituted for the former. He marks that with deeper mining, wider barriers may be required, and that possibly power should be granted the Commissioner to require such extensions when considered necessary.

Clauses (c), (d), (e), and (f) are next discussed. (c) Provides that, where there is less than 500 ft. solid cover over the seam worked, the workings shall be laid out in districts of an area not greater than half a square mile, each district being enclosed by a barrier not less than 30 yards in thickness, which shall not be pierced by more than four passage-ways of a section area not greater than 4 feet wide by 6 feet high. The inspector may, if he thinks it necessary, permit the cross-section of the passage-ways to be increased to 6 square feet. (d) Restricts to one mile the length of any district when parallel to the general trend of the shore line. (e) Requires the approval of the inspector for any proposed system of working, also his sanction to any change in the approved system. (f) Provides that the opening of a new lift or level in a mine already working shall be deemed the commencement of new winning within the meaning of the section.

The first two regulations provide for the application, between the lines of 180 and 500 feet of cover, of a system known as the “panel system,” under which the area to be worked is divided into districts or “panels” surrounded by barriers through which as few holdings are made as may be considered absolutely necessary. The restricted dimensions of individual workings are designed as a safeguard against general flooding. Mr. Foster disapproves of the above restrictions. They cause great inconvenience in haulage and ventilation. He states that it is better to rely upon well proportioned pillars and careful regulation of the width of the working places and disposition of the same.

In general it is recommended that provisions (c), (d), (e), and (f) be eliminated, and that the conduct of undersea workings be regulated, not by hard and fast rules, but by a careful consideration of each set of circumstances.

Incidentally, Mr. Foster mentions the necessity of making surveys and levellings every three months. Soundings should also be taken at reasonable distances

## THE VALUATION OF MINING AREAS ON THE RAND

By W. Fischer Wilkinson, Member.

Paper read before the Institution of Mining and Metallurgy, London.

During recent years it has become the practice on the Rand, when forming new mining companies, to include a much larger area of ground than was the custom formerly, while several mines already formed into companies, have secured larger areas by amalgamation with neighbouring properties.

In laying out the first row of mines below the outcrop mines the area selected used to be about 200

claims (294 acres) for each mine with a milling plant of 200 stamps, the depth of the workings being from 1,000 to 3,000 ft. The standard adopted was a stamp a claim, the stamp being equivalent to an output of five tons per day. This area is now considered too small and companies with 1,000 claims and upwards have been formed.

These changes in the areas selected make it of in-



terest to consider the factors that decide the size of a mine and the principles upon which valuations should be founded.

As regards the question of size, it may be stated generally that the larger the area the less will be the capital expenditure on equipment and the less the working costs per ton. It is obvious that a large area lends itself to more economical development than a small one. Administration and general expenses, being spread over a larger tonnage, are proportionately reduced, while a great saving in capital expenditure is obtained by concentrating the reduction and power plant instead of having a number of small units.

The statistics of the Rand mining companies illustrate very forcibly the advantages of large units. The writer has compiled from the August, 1908, sheet of the Transvaal Chamber of Mines the following table, which shows the effect of large outputs as compared with small. The figures relate to 53 out of 63 mines in the Witwatersrand district. The 10 mines omitted are either small producers or mines which do not report working costs.

**Results of 53 Milling Companies on the Rand,  
August, 1908.**

| Tonnage treated.<br>Tons. | Com-<br>panies. | Yield<br>per ton<br>milled. | Costs<br>per ton<br>milled. | Profit<br>per ton<br>milled. |
|---------------------------|-----------------|-----------------------------|-----------------------------|------------------------------|
|                           |                 | s.                          | s.                          | s.                           |
| Under 10,000 .....        | 10              | 33.4                        | 23.4                        | 10.0                         |
| 10,000 to 20,000....      | 13              | 29.6                        | 20.0                        | 9.6                          |
| 20,000 to 30,000....      | 13              | 28.8                        | 17.0                        | 11.8                         |
| 30,000 to 40,000....      | 10              | 31.0                        | 17.0                        | 14.0                         |
| 40,000 and upwards        | 7*              | 32.6                        | 14.8                        | 17.8                         |

With regard to this table, it is advisable to mention, in order to prevent any misunderstanding, that the costs and profits shown are what are known as costs and profits on working account. Profit tax, depreciation and sundry expenditure, are not included. There is generally a difference of about 30 per cent. between the working profits shown and the profits distributed as dividends, that is, the dividends are 70 per cent. of the working profits.

The effect, therefore, of working on a large scale is to reduce working costs, and it is clearly an advantage to have a large area and to make the output as large as possible, paying due regard to capital expenditure and life.

In calculating the most suitable rate of working for any given area it is necessary, in the first place, to make an estimate of the probable tonnage and of the value of the ore. The Rand ore deposits are of such a character that fairly reliable estimates can be made, the reliability depending on the situation, size, amount of development, and records of neighbouring mines. Granting that calculations of this sort have been made, and that definite figures have been arrived at as to the amount of gold that the mine contains, the problem that then needs solution is the rate at which it may be most profitably extracted. The elements of the calculation are:—

1. Capital expenditure required for a given production.
2. The available tonnage and its value.
3. The cost of working.
4. The rate of interest required.

\*Included in this class is the East Rand Proprietary Company, which is rather a group of mines than one unit. If the figures of this Company are omitted the averages for mines milling over 40,000 tons per month would be six companies, yield 33.4s., costs 13.8s., profit 19.6s.

In mine valuations of this class it is time that is the important factor. As long as the gold is left in the ground, there is a loss of interest going on and, after a certain period, this loss of interest will exceed the cost of new shafts and equipment. An example will make this point clear. Suppose a property contains 1,000 claims and a tonnage of 20,000,000 tons estimated to give a net profit of 10s. per ton, and suppose the equipment is equivalent to an output of 400,000 tons per annum; the life would be 50 years and the annual income £200,000.

The present value of an income or annuity of £200,000 for 50 years, assuming that 6 per cent. interest is demanded and that a sinking fund to redeem capital was invested at 3 per cent., would be worth 14.5<sup>1</sup> years' purchase, or £2,900,000. If, however, the ground had been divided into two mines, or if the output had been doubled by increasing the reduction plant, the annual profits would have been £400,000 for 25 years.

The present value of this income is worth 11.5 years' purchase, or £4,600,000. There is therefore an increased value by doubling the rate of production of £1,700,000, which would far exceed the capital expenditure necessary to secure this increased rate.

This example indicates that in order to obtain the greatest value from any mining area containing definite values, as on the Rand, it is possible to calculate with some precision the most profitable rate of working.

The formulae necessary for calculating the most profitable life from a theoretical point of view have been given by Mr. Hellman,<sup>2</sup> Mr. Ross Browne,<sup>3</sup> Mr. R. N. Kotze,<sup>4</sup> and others.

According to Mr. Kotze, the most suitable life for a mine giving a 20s. profit per ton is about 11 years, and that for a mine with ore yielding a profit of 10s. a ton, 16 years. The definition that he gives of the most profitable life is that at which the ratio of increase of present value of profits to increase of working capital becomes unity. This would be the most profitable life theoretically. In practice, however, the life should be extended somewhat, and the ratio taken higher than unity. Mr. Kotze also comes to the conclusion that the larger the profit per ton the shorter would be the more profitable life if other conditions remained the same.

No doubt the calculations given in his paper would have to be modified to suit present conditions, the capital expenditure required for a given production being now less than at the time the paper was written. But as the effect of a decrease in the capital expenditure for a given output would be to decrease the, theoretically, most profitable life, the ideal life, on a 10s. per ton profit basis, may be taken to be under 16 years.

Mr. Ross E. Browne, who has also made calculations as to what is the most profitable life, arrives at the conclusion that 10 years is the ideal life.<sup>5</sup>

These calculations go to show that the life must be kept within bounds to obtain the greatest value out of a given area. The author wishes to emphasize this point because in recent amalgamations a long length of life has been put forward as a favourable feature.

It is no doubt a good thing for a mine to be worked on a large scale, but it does not follow that its life should extend beyond certain limits, which, as shown above, can be calculated.

<sup>1</sup>Inwood's Tables, p. 121a, 28th edit.

<sup>2</sup>Trans. Inst. of Min. and Met., vol. vi.

<sup>3</sup>Proc. S.A. Assoc. Eng., 1907.

<sup>4</sup>Trans. S.A. Assoc. Eng., vol. x., 1904-5.

<sup>5</sup>Trans. S.A. Assoc. of Eng., 1907.



The author does not wish it to be understood that he advocates the working of a mine strictly on the theoretical standard. In practice, it would, in his opinion, be unwise to go to the extreme limit. Even on the Rand there must be uncertainty as to the total tonnage by financial and labour considerations, factors which are variable and uncertain.

The safest course in practice would be to lay out the mine at the start for a production below the ideal production, but the aim should be to work ultimately to the scale of operations that calculations of total profits and total expenditure indicate as the most profitable.

In coming to the decision as to what is the best scale of operations, an important point to be considered is that of the most profitable grade to work to. The ore deposits of the Rand are such that the engineer can vary his grade within wide limits. He can increase his tonnage and lower his costs by including low-grade ore, that is, ore on which there is only a small margin of profit. Low costs and large tonnages do not, however, necessarily mean that the mine is being worked to the greatest profit.

To determine the most profitable grade it is necessary to calculate the present value of the total profits expected.

To illustrate this, the author will suppose that a mine has 1,000,000 tons which will give a profit of 20s. per ton, and that, by leaving some of the poorer ore in the mine, a production of 800,000 tons, giving a profit of 25s. per ton, can be obtained.

The question arises which is the more profitable grade to work, the high grade and the smaller tonnage, or the low grade and the larger tonnage. Assuming that the reduction plant will treat 200,000 tons per annum, the life will be either five years or four and the annual profits either £200,000 or £250,000. Calculating the present value of these profits on the annuity principle and assuming that 6 per cent. interest is required and that a sinking fund for the redemption of capital is invested at 3 per cent., the low-grade policy will show a present value of £806,000, and the high-grade £835,000. Consequently the high-grade is the more profitable grade to work to.

It will be observed that in all calculations as regards life or grade one of the most important factors is time; and it is this factor that carries great weight in valuations of deep level claims, which may be proposed for amalgamation with an adjoining property.

Some examples of the sort of valuation required may now be considered. Taking a simple case, that of the amalgamation of two undeveloped areas, each too small to be worked separately, but which together would give an area of suitable size for a mine, the valuation of the ground would depend on the Present Value of the profits to be derived on an assumed rate of working. It is usual to assume that the profit to be derived from the deepest ground would be less than that from the more shallow, partly on account of the profit being deferred and partly due to the assumption that working costs increase and consequently profits decrease with the depth of working. That is what is known on the Rand as the zone basis of valuation.

For convenience the ground is divided up into belts or zones parallel with the strike, and a value is calculated for each zone. The author believes in this system of valuation provided it is not carried to extremes. If carried too far, the value of the deeper claims is unduly

depreciated. The profits are discounted over too long a period, and a fairer way to value such claims would be to assume that they could be made productive earlier—which might be the case if a new shaft was put down—than if they had to wait for the exhaustion of all the ground above them. The relational value of claims has received considerable attention in South Africa, and those who wish to study this subject are recommended to read the paper by Mr. G. A. Denny, read before the S. A. Association of Engineers,<sup>1</sup> and the discussion that followed.

Another case that may be considered is that of the amalgamation of deep level claims with those of a producing and profit-earning mine. In this case the value of the deep claims to the producing mine will depend on the amount of tonnage still available in its own property—in other words on its life—unless the development of the deep ground can be taken in hand before the exhaustion of the upper ground.

The value of the deep level claims to the producing mine is the Present Value of the estimated profits at the time when the upper claims are exhausted. If the producing mine has still a long life before it, the value of the deep claims will be small, because the profits to be derived from the deep claims will be so long deferred.

It must also be borne in mind, when valuing claims, that there is a liability attached to them in the way of claim license, amounting to £3 per annum. The capitalized value of the claim licenses must be deducted from the capitalized value of the profits expected in the future. The factor time here again exercises an important influence, and if the realization of the profits is to be long postponed, the value of the claims will be small and may, in fact, be a minus quantity.

A third and somewhat more complicated case may now be considered.

As a rule, when an amalgamation of a producing mine with deep level claims is effected, an increase in production is arranged for, and the owners of the deep claims frequently contribute capital for this purpose. In making a valuation of the different interests in such a case, it would be necessary to calculate the Present Values of the estimated profits to be derived from different claims put in, and also to assess separately the value of the other assets, such as equipment, development and cash.

Both sides benefit by amalgamation owing to the speedier realization of the profits, and the case differs from that previously given in that the producing mine has here to consider the value of the extra profit that will accrue owing to the increased scale of operations which the capital of the deep block allows of, whereas, when no increase of production takes place, the producing mine has merely to decide whether the price put upon the present profits of the deep ground is sufficiently attractive.

There is one other point of great importance relating to mine valuation to which the author wishes to draw attention. It is well known that on the Rand there are rich reefs and poor reefs, as well as great variations in values in the reefs themselves. It is usual to work out the ore at an average grade, taking each reef out in its proper proportion. This system is financially sound.

Theoretically, to get the most value out of a mine, the grade in the early part of the mine's life should be higher than in the later years. In practice it is of

<sup>1</sup>Trans. S.A. Assoc. Eng., vol. 1, 1902-3.



course not possible to mine all the rich ore first and then return to the poor. Stopes or levels cannot be kept open indefinitely without great expense. At the same time the author thinks that some selection is possible, and that if the richest reefs and the richest sec-

tions of the poorer reefs were attacked first, a higher grade than the average could be obtained during the early years of the mine's life. A considerable appreciation in value would result from the adoption of this policy.

## GRAPHITE CONCENTRATION.

By H. P. H. Brumell, Buckingham, Que.

(Journal of the Canadian Mining Institute. Part of Vol. XII.)

Apparently simple, the solution of the problem of the concentration of the graphite contents of disseminated ore has proved extremely difficult, and it is only after many years of assiduous endeavour that we have arrived at the present modicum of success. As early as 1860 efforts were made to market Canadian graphite, and in 1867 the first mill for the dressing of the ore of Labelle County was begun in the Township of Buckingham. Since this initial effort, however, several mills have been erected, each, in succession, embodying some new feature and showing a gradual advancement from the early and crude method of buddling to a system of dry separation, now conceded to be the only logical method of treating so fugacious a mineral as graphite.

In the following brief resume of the work done in Canada, reference is made only to that ore so abundantly found in the County of Labelle, in the Province of Quebec, and sparingly in the counties of Renfrew and Markham, in Ontario. This ore is essentially a graphitic gneiss or gneiss carrying the graphite in more or less small lenticular particles and consists, in Labelle Co., of quartz, feldspar (usually orthoclase) and hornblende, with smaller quantities of pyroxene, sillimanite and graphite. The major portion of the gangue material is made up of quartz and feldspar, both having a specific gravity of about 2.5, while the gravity of Canadian crystalline graphite is 2.26, which leaves a very small margin on which to work. The remaining minerals are somewhat heavier, the specific gravity of hornblende being about 3, pyroxene 3.3 and sillimanite 3.2. Pyrite, with a gravity of about 5, is a negligible consideration, both on account of its greater weight and, the usually very small percentage in the ore.

The earlier attempts at concentration were all made with stationary buddles of a uniform type, the vat being about 16 feet in diameter, with a depth of 3 feet, the floor having a slope of 3 inches from the centre post to the edge. After being crushed in ordinary jaw crushers, the ore was stamped wet and fed to the buddles, with a considerable stream of water, entering them through short pipes from a revolving pan fixed to the lower end of the shaft, to which, also, was attached adjustable sweeps. These sweeps gave to the water and accompanying ore a gentle centrifugal motion, sufficient to carry away the lighter particles of graphite, which were deposited around the edge of the buddle, the heavier minerals being deposited near the centre, while the superfluous water escaped through a sluice gate at the side, control of which was effected by means of small swinging stops. When a buddle was filled it was allowed to drain and the material taken out by hand, the outer zone being of concentrates followed by a lining of seconds or middlings, the innermost portion consisting of tailings. These seconds were re-buddled a second and, sometimes, a third time. By the foregoing

method a very coarse separation was made, the concentrates rarely assaying 60 per cent., from a 10 per cent. ore. On drying, however, and passing the dried product over a series of screens, considerable quantities of the coarser sized flakes were obtained. Mills equipped in this way were erected and spasmodically operated at Oliver's Ferry in Ontario, and in Buckingham and Lochaber Townships in Quebec, but were unsuccessful; the non-success, as proved by later development, being entirely due to the system of disintegration and concentration. The ore, while soft and lubricous, is a peculiarly tough one and difficult to stamp, the stamps at times working the crushed wet ore into the shape of a cylinder with smooth polished sides, in which the stamp moved freely and ineffectively. As to capacity the best result obtained was about one ton per day per stamp (850 lbs.) and, as the buddles were emptied by hand, no practical mechanical means having been found, the entire process was found to be slow and much too costly. At several of the early mills keeves were used with but slight success. Experiments carried on at the mill of the North American Graphite Company in 1899 resulted in the replacing of the buddles by the so-called Brumell separator which, although a vast improvement on the buddles, soon gave way to pneumatic separators, the type first used being the Hooper concentrator. After the installation, at this mill, of the latter a fairly economical system was adopted and the ore was rolled dry. After crushing, the ore was dried in a revolving fuel dryer after which it passed through two pair of rolls, the overs of a 20 cloth being returned, and the resultant material sized in revolving screens. The sized material was then treated on the Hooper tables, the concentrates going to the finishing plant, while the seconds went to the Brumell separators, the concentrates of which were then dried and sent with those from the Hoopers to be finished. The foregoing has been superseded at the mill of the Buckingham Graphite Company, by the adoption of a system of dry concentration throughout, involving the abolition of the Brumell concentrator. The ore, after crushing, drying and rolling is brought by an impact screen to a certain degree of fineness, after which it is sized in a dry ore sizer; certain sizes being treated on a new type of pneumatic concentrator, other sizes going to the Hooper tables, while the finer ones are treated on a barrel concentrator. This mill is believed to be the only one commercially producing graphite from disseminated ore. While concentration has been the chief difficulty, there is another important feature in the manufacture of graphite, viz.:—finishing and grading to suit the various trades using the mineral. In a graphite mill there are three distinct departments for crushing, concentrating and finishing. In the former every endeavor is made to bring the ore to a



size wherein the particle is "freed" from its matrix without reducing its size, as in the markets a large sized flake commands a much higher price than the smaller ones, flakes coarser than 70 mesh being most in demand. The desirable condition is brought about, in a marked degree, by the use of rolls set in sequence of increasing pressure and the material scalped off as it is rolled to the desired mesh. In practice it has been found that a series of rolls bringing the ore to a maximum mesh of 20 gave the best results when, with proper care and manipulation, 80 per cent. of the material would be of a size between 20 and 80 mesh, 10 per



Buckingham Graphite Company's Mill, Buckingham, Que.

cent. between 80 and 150, and 10 per cent. allowed to go to the waste dump as too fine for economical treatment. After concentration the treatment accorded the material is continued with millstones of various materials, and revolving flour mill screens. In this treatment, as in rolling, care is taken to reduce the size of particle as little as possible, the object being to grind and reduce to a powder the associated foreign, and mainly silicious, materials, separation from which is effected by a system of scalping and the milling and screening is carried on until the residual material is a fine ground graphite, suitable for stove polish, foundry facings and paint, assaying from 25 to 75 per cent. With the plant as installed at the Buckingham Graphite Company's mill, the ore, carrying about 12 per cent. of graphite, is concentrated up to from 75 per cent. to 86 per cent. according to size, and the concentrates, in turn, finished, the finished or marketable stocks assaying from 70 per cent. to 96.5 per cent.

The following brief descriptions of the various plants in Ontario and Quebec, other than that of the Buckingham Graphite Company already described, embody all that the various owners have allowed to be known and are, in consequence, not strictly accurate as to detail.

#### The Buckingham Company.

This mill, which must not be confounded with that of the Buckingham Graphite Company, is situated on lot 26, range VI, township of Buckingham. The ore after a preliminary drying, was crushed and rolled with one Dodge crusher and one set of Krom rolls, after which it passed to screens and buhrstones. The entire product of the rolls, without any attempt at classification or concentration, was then run through buhrstones, reducing much of the gangue to a proper degree of fineness, after which it was run over silk bolting cloths, the graphite particles, which escaped the grinding operations, tailing over. This process was found to be so wasteful of the graphite contents of the ore that the business was closed down and the mill has now been idle for about ten years.

#### Anglo-Canadian Graphite Syndicate, Limited.

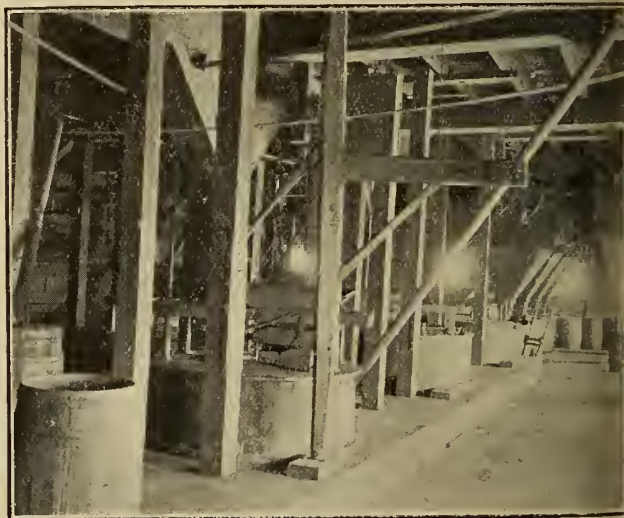
The works of this late company, formerly the North American Graphite Company, are situated on lot range VI, township of Buckingham, about one mile to the north-west of the foregoing and were operated on part dry and part wet principle. The ore was crushed then dried in a revolving fuel dryer, passing thence two pair of rolls, the overs of a 20-screen being returned and re-rolled. From the rolls the crushed ore passed to a battery of revolving screens, making four sizes which were then treated on Hooper concentrators, middlings going to two Brumell separators, the concentrates from the latter dried in a revolving steam dryer. The concentrates from both these sources were then finished with buhrstones and reels clothed with silk bolting cloths. These works were closed down about five years ago and have remained idle since.

#### The Diamond Graphite Company.

This mill is located on lot 14, range X, township of Buckingham, and is, at the time of writing, in process of reconstruction. The system first adopted was similar to that at the Buckingham Company's plant, no attempt at concentration being made. The ore, after drying, was crushed and rolled, going thence to flouring rolls instead of buhrstones, after which a system of screens was supposed to complete the operation. This method was found to be very wasteful and the management decided to replace the flouring rolls with Krom pneumatic mills and the change is now being made. No attempt at finishing the concentrates beyond screening is, apparently, contemplated.

#### The Bell Mines.

This mill is situated on lot 2, range V, township of Buckingham, and is the only one in Canada employing



Part of Finishing Plant, Buckingham Graphite Company, Buckingham, Q.

a wet method throughout. The ore, after crushing, reduced, with a heavy stream of water, in a Williams disintegrator to about 10 mesh, after which it is classified with wet screens and treated in Kendall separators. As far as is known no further treatment is accorded concentrates.

The development of this mill, which is the new in the district, is being watched with interest on account of the methods employed. Some of the concentrates obtained during the trying out of the plant were particularly good.



### The Calumet Graphite Mining and Milling Company.

The works of this company are located on lot 16, range II, township of Grenville. In this mill no attempt, apparently, was made at concentration, though but little is known of the methods employed. It is understood that no shipments of finished stock were made, the total production consisting of a quantity of ground ore, not sufficiently pure for even the lower uses to which graphite is put. The finished material referred to was the product of a pebble mill, installed for the avowed purpose, according to the monograph on "Graphite," published by the Mines Branch of the Department of Mines, of "cleaning and polishing of the graphite flakes." This method of "cleaning and polishing" would appear to have cleaned and polished the graphite to a vanishing point, as the resultant material was a grey, lack-lustre powder consisting of ground limestone and associated minerals, and graphite, of no commercial value. This

that in Germany and Austria, where the concentration extent, nearly all the mills operate on wet principle and in the United States on a combination of both wet and dry.

In the following brief descriptions of the various concentrators and methods of graphite ore dressing in Canada it is not thought necessary to enter into details as to the various types of crushers and rolls. The latter may be of any good type but should not be differential, while for the preliminary rough crushing all types of crushers have been used, the best service, in jaw crushers, being obtained with those of the Dodge type. On account, however, of the slippery character of the ore, particularly if it have a high graphite content, it has been found that better results were obtained when a rotary crusher was used, of which there are several types all equally suited to the work.



DIAMOND GRAPHITE COMPANY'S MILL, BUCKINGHAM, QUE.

View from South-East.

It is not now in operation. Reference to the use of pebble mills will be made further on.

### Globe Refining Company.

This mill, located at Port Elmsley, Lanark county, Ontario, was operated spasmodically until 1905, since when it is believed to have been idle. The ore, after crushing, was dried on a stationary sloping floor dryer and after being rolled was classified with revolving screens, from whence it went for treatment on Krom jigs over which it was milled on millstones and their accompanying screens. In practice the Krom jigs were not found to be satisfactory and in consequence taken out and the finished product made by flouring rolls and reels, similarly to the process until lately prevailing at the Diamond Graphite Company's mill in Buckingham.

For the purpose of this paper it is not thought necessary to enter into descriptions of the various concentrating methods in vogue outside of Canada, except to say

The following, in brief, are the various concentrators which have been, or are being, used in Canada.

### Wet Separators.

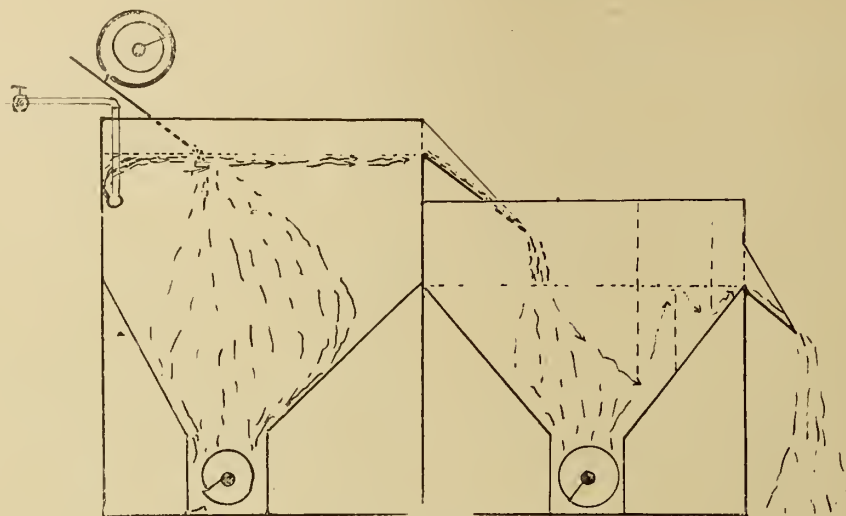
Buddles.—Already described.

Keeves.—Tubs, usually, of three or four feet in depth, by three feet in diameter with removable sweeps attached, at right angles, to a vertical shaft in the centre. The ore, usually fines, was fed, with a sufficiency of water, until the tub was filled, a strong centrifugal motion being imparted by the sweeps. When the charge was completed the sweeps were elevated and while the contents were settling the tub was knocked on the outside, the slight jarring effect keeping the lighter graphite in suspension longer than the heavier gangue minerals. The operation lasted about three hours, when the water was drained off and the sediments removed by hand. In a three foot keeve there was usually a deposition of about fifteen inches, the graphite, in a fair state of con-

centration, being found uppermost. The operation was slow and, requiring hand labour, was expensive and was never adopted to any great extent.

**Brumell Separator.**—This is a method, rather than a machine, and relies upon the floatability of graphite, when dry, upon, rather than beneath, the surface of

over into a settling tank, hopped to the centre, where it is wetted, and drops through an opening into a spiral steel conveyer enclosed in a tube and inclined at an angle of  $45^\circ$  from whence it is fed automatically to a revolving steam dryer. The water passes under and over several stops and eventually escapes through a screen at the op



BRUMELL SEPARATOR.

water. The apparatus employed is a square wooden box, twenty feet in length by four feet wide and five feet deep, filled with water and with a surface current extending across its width, obtained by jets projected against the side at an upward angle of  $45^\circ$  and about nine inches below the surface. This box is hopped along the sides, the cants throwing the tailings into a worm conveyer which, in turn, conveys the refuse to an elevator with perforated bucket, the chain of which

posite side. This apparatus, while very economical as to power and capacity and entirely automatic, is, at best, only a rough concentrator rarely bringing a 10 per cent. ore up to 65 per cent., and in consequence is not now in use.

**Kendall Separator.**—This machine, patented in 1902, is the invention of Mr. C. Kendall and is now in use at the Bell mine in Buckingham township where it is being practically tested. In principle it relies on the affinity

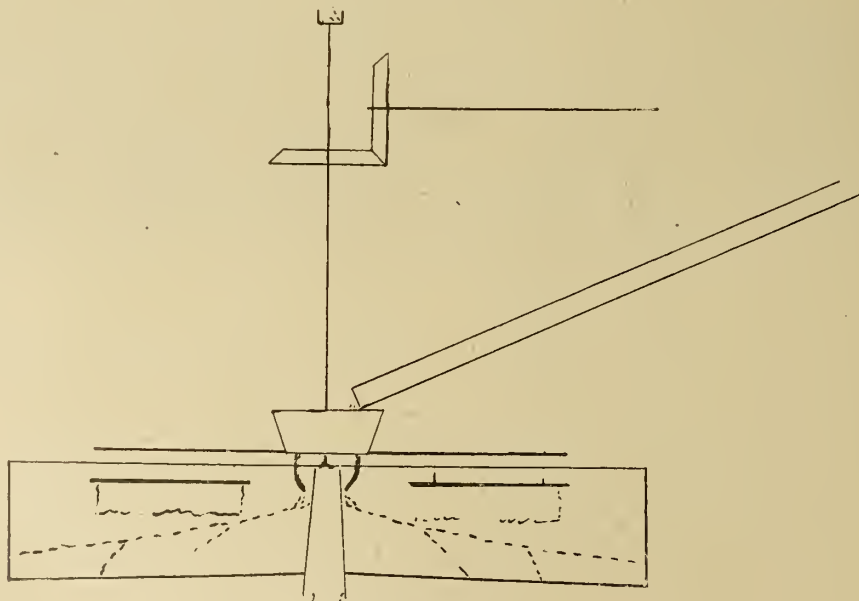


DIAGRAM OF BUDDLE.

actuates the conveyer. The dried ore is fed to the surface near the side over the jets by means of a spiral steel conveyer enclosed in a tube with a longitudinal slot the entire length, and, passing over a glance board, is dropped about one half an inch in a thin curtain to the water. The graphite which remains floating is carried

of oil for graphite and consists of a vertical cylinder terminated at the base with an inverted cone. The ore is thoroughly mixed with a superabundance of water and before entering the separator is again mechanically mixed with a heavy gravity mineral oil. The whole, while in an agitated state, is fed down to near the base



f the machine by an inner tube which extends to a height of about ten feet above the cylinder. The graphite, with its adhering particles of oil, rises to the surface and flows in a thin film over the edge of the cylinder to a launder which carries the pulp off to a settling tank from which the oil is syphoned to be used again. At the bottom of the cone is a swinging gate valve, which allows the water and tails to escape and acts, at the same time, as a regulator to the thin film of oil and graphite flowing over the lip of the cylinder. In principle this method is undoubtedly good but time will tell as to its practicability. Great difficulty will, no doubt, be encountered in keeping a regular height on the continuous charge in the cylinder and the problem of entirely ridding the graphite of the oil will, probably, be difficult to solve.

#### Dry Separators.

**Labouglie Separator.**—In 1876 a patent was issued to Joseph Labouglie, of Buckingham, which covered the adaptation of an ordinary fanning mill. The dried ore was dropped before the blast of a fan, similar to a grain winnowing fan, and the lighter graphite was

their respective bins, the finer smaller particles from the uppermost and the heaviest from those near the bottom of the shaft. Needless to say this method was not a success.

**Krom Pneumatic Jig.**—This was probably the first pneumatic machine to be used in Canada and has been found, while good in principle, to be somewhat too delicate in operation for practical work. It consists of a chest containing a swinging door blower giving rapid pulsations of air which is carried to tubes of silk bolting cloth arranged close together to form a bed whereon the concentration is made and as the continuous charge of ore is carried forward in strata a knife edge adjustable tail board is supposed to skim off the graphite, allowing the tails to drop under or behind. There are many details as to arrangement of feed and delivery of heads and tails which need not be gone into here. With an uniform ore and an absolutely steady power the machine would, no doubt, be very satisfactory, but these are conditions difficult to obtain. The monograph on "Graphite," already referred to, thus naively refers to the machine: "The apparatus, when



GLOBE REFINING COMPANY'S MILL, PORT ELSLEY, ONT.

View from South-East.

supposed to be projected further than the heavier gangue minerals and receptacles were arranged at increasing distances for the collection of the various products. It is not necessary to say that the machine was never adopted and mention is only made here to illustrate the early date at which efforts were directed towards dry separation.

**Nappenburg Separator.**—This apparatus was installed at the mill later owned by the Buckingham company, but at the time of its installation was owned by Messrs. Pew and Weart. In principle it was similar to the separator just described but much more elaborate and consisted of a deep shaft or well about two feet by one foot with blasts arranged at various points directed horizontally from the wider side across to screens of various mesh. The dried ore was fed in a curtain from the top, dropping down in front of the blasts, which were supposed to project the lighter graphite across to and through the screens. These blasts were arranged in increasing strength from top to bottom and the various screens had sprouts which were supposed to, but unfortunately never did, convey the concentrates to

carefully watched, works satisfactorily, but it has no power of self regulation. This causes the machine, if fed more rapidly than normal, to contaminate the concentrates, the flakes with the tailings, and if fed less rapidly to lose concentrates in the tailings. And, further, if the feed be regular in quantity but the percentage of graphite variable, then the rise in percentage will enrich the tailings and the fall in percentage will contaminate the heads."

**Hooper Pneumatic Concentrator.**—This machine consists of a flat chest containing a diaphragm actuated by eccentrics on a driven shaft running horizontally beneath the chest, and this chest, in turn, is surmounted with a movable deck of a peculiar design, the two separate parts being connected with a hollow ball and socket joint. The eccentrics, which are adjustable, act upon the diaphragm causing pulsations of air to pass up through the ball and socket joint and through a second diaphragm immediately below the deck which consists of a cast iron grating covered with broadcloth. Over this grating is the concentrating top, consisting of a cast iron frame with parallel strips



of sheet brass extending diagonally from side to side, and these in turn are surmounted by another set of parallel strips diagonally in the other direction. The ball and socket joint permits of the top being set at any vertical or lateral inclination. The ore is fed to the upper end of the concentrating top and is aided in its travel to the lower end by the rapid pulsations of air which pass up through the broadcloth effecting at the same time a concentration according to gravity. The lower brass strips, or riffles, carry the heavier portions to the lower side of the deck while the upper brasses or channels carry the lighter or top stratum diagonally to the upper side. At the discharge end of the deck are finger pieces which guide the various products to their respective receptacles. These machines require very accurate sizing of material and when once set as to eccentric throw, speed and vertical and lateral inclination, require no further care beyond cleaning the broadcloth bed which should be done about every five hours.

**Barrel Concentrator.**—This machine has given excellent results as a rough concentrator and consists of a

either two, four or six and the object is, presumably, to crush to a dust the foreign material and to trust to luck that the particles of graphite slip through untouched. In practice it has been found that a very large proportion of the graphite was ground, as well as the gangue material, and that it was not possible to obtain a particularly high grade of graphite by this method.

**Pebble or Tube Mills.**—Probably the most erroneous idea prevalent among inexperienced graphite producers is that these mills can be used for the cleaning of graphite from the gangue and for the polishing of the graphite flakes. In the monograph on "Graphite," already referred to, appears the following very misleading statement: "This mill on account of its great efficiency and smooth action has found its way into graphite mills of recent date; it is used for polishing and grinding graphite flakes and can be so adjusted that the latter are freed from sand; it replaces effectually the old buhrstone mill, while other mills either crush, twist or cut the material."

No more misleading statement could possibly have



NORTH AMERICAN GRAPHITE COMPANY'S MILL, BUCKINGHAM, QUE.

View from West.

revolving cylinder set with a slight downward inclination and having straight narrow flanges extending throughout its length. The discharge end is open while the feed end fits, as snugly as possible, into a square stationary chest to the opposite side of which is connected the suction pipe of an ordinary exhaust fan. The ore is fed into the upper end of the cylinder and, by means of the flanges, is carried up and dropped across the exhaust draft in the cylinder, the inclination finally discharging the tails at the lower end. From the fan the concentrates are blown into a dust collector or bag house for further treatment. It is unnecessary to state that for this treatment it is essential that the ore be very carefully sized.

Someone has written somewhere that "separation without classification is damnation" and this certainly is the case where pneumatic concentrators of any type are used.

**Flour Mill Rolls.**—This treatment of graphite should not properly be classed as concentration as the operation consists merely in rolling with smooth rolls set with a slight differential. These rolls are in sets of

been made as these mills are used only for fine pulverization and are usually equipped with an exhaust, with dust collector, which draws off the material when ground to the required degree of fineness. In point of fact these mills have replaced all other fine grinders in the various larger works in the United States where it is required to "kill the flake," a not very simple matter, and certainly not a desideratum with producers of flake.

#### RESCUE APPARATUS IN AUSTRIAN MINES.

The Austrian Mining Board has recently issued an interesting regulation relative to the use of rescue apparatus in mines.

Some approved form of rescue apparatus shall be kept in working order, and in a readily accessible place, at all mines. In order to keep the valves and fittings from being attacked by rust, the oxygen bottles must be perfectly dry inside, and recharged with dry oxygen by a dry pump. In the most dangerous class of mines five sets of rescue apparatus must be kept when not



ore than 200 men are at work per shift, 10 sets for shifts of from 200 to 400 men, and 15 for shifts of over 400 men. Each apparatus must be capable of supplying oxygen for 1½ hours. In non-fiery mines the number of apparatus is fixed at five, irrespective of the number of men per shift, except that where there are below 200 an apparatus supplying oxygen to last one hour is permitted.

Where a number of dangerous mines, employing over 200 men per shift are situated close together, all the apparatus in excess of the five sets necessary to equip one corps of rescuers may be kept at a central station of easy access. Rescue stations must be furnished with a duplicate source of oxygen bottles and number of safety lamps of some permitted type; one lamp for testing the presence of fire damp is necessary when the other lamps are electric. A trained man must be placed in charge of the station and made responsible for the good order and maintenance of the equipment. The men trained for rescue parties must be medically examined, and each corps must use the apparatus at least every six months.—Eng. and Min. Journal.

### THE RECENT ASBESTOS MERGER.

The Amalgamated Asbestos Corporation, Ltd., has been granted a charter under the laws of the Dominion of Canada to acquire, control and operate various asbestos producing properties situated on the line of the Quebec Central Railway, in the Province of Quebec.

#### Capitalization.

The capitalization of the merger is \$25,000,000, made up as follows:—

|                                                                                                                                                                                                                                                                                                                                                             |              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Authorized .....                                                                                                                                                                                                                                                                                                                                            | \$15,000,000 |
| Reserved for future requirements .....                                                                                                                                                                                                                                                                                                                      | 7,500,000    |
| To be issued .....                                                                                                                                                                                                                                                                                                                                          | \$7,500,000  |
| Preferred stock entitled to cumulative dividends at the rate of 7 per cent. per annum on and after Jan. 1, 1910. This stock takes precedence over all other classes of stock in the event of liquidation, either voluntarily or otherwise, and is convertible share for share into the common stock of the company at any time at the option of the holder. |              |
| Par value \$100.....                                                                                                                                                                                                                                                                                                                                        | \$1,875,000  |
| Common stock. Par value \$100.....                                                                                                                                                                                                                                                                                                                          | 8,125,000    |

There are enough asbestos producers in the merger to give the corporation control of at least 70 per cent. of the world's supply. The producing companies of the province during the year 1908 were:—

|                                           |                |
|-------------------------------------------|----------------|
| Keasbey and Mattison (Bell).....          | Thetford       |
| British-Canadian (American).....          | Black Lake     |
| Standard Asbestos Company.....            | Black Lake     |
| Dominion Asbestos Company.....            | Black Lake     |
| Union Asbestos Co. (British-Canadian).... | Black Lake     |
| King Asbestos Mines .....                 | Thetford       |
| Johnson Asbestos Company.....             | Thetford       |
| Beaver Asbestos Company.....              | Thetford       |
| Broughton Asbestos Fibre Company....      | East Broughton |
| Quebec Asbestos Company.....              | East Broughton |
| Eastern Townships Asbestos Company.....   | East Broughton |

|                                                                |                |
|----------------------------------------------------------------|----------------|
| Boston Asbestos Mining Company....                             | East Broughton |
| Frontenac Asbestos Mining Company (erecting mill) .....        | East Broughton |
| Asbestos Mining and Manufacturing Company (now shut down)..... | Chrysotile     |
| Thetford Asbestos Company (undergoing reorganization) .....    | Thetford       |

Of the companies named above those amalgamated are:—

- The British-Canadian Asbestos Company.
- The Standard Asbestos Company.
- The Dominion Asbestos Company.
- The Union Asbestos Company.
- King Asbestos Mines.
- The Beaver Asbestos Company.

And the Bell Asbestos Mines by a contract for the entire production over and above the requirements of the Keasbey and Mattison Company, manufacturers of asbestos products, and the affiliated companies controlled by Dr. R. V. Mattison.

#### Board of Directors.

The following named gentlemen have consented to serve as directors; Henry M. Whitney, Boston, president, the British-Canadian Asbestos Company, Ltd.; Hon. Robert Mackay, Montreal, director Canadian Pacific Railway Co., Bank of Montreal, the Royal Trust Co., and Bell Telephone Co. of Canada; Howard Ellery Mitchell, Philadelphia, of Cramp, Mitchell & Shober, bankers; Richard V. Mattison, M.D., Ambler, Pa., president Bell Asbestos Mines, Keasbey & Mattison Co., Asbestos Shingle, Slate & Sheathing Co., Asbestos Manufacturing Co. of Lachine, Canada and the First National Bank of Ambler, Pa.; E. B. Greenshields, Montreal, director Bank of Montreal, Grand Trunk Pacific Railway Co., the Royal Trust Co., and the Standard Life Insurance Co.; president Greenshields, Ltd.; Harry A. Berwind, Philadelphia, Berwind-White Coal Mining Co.; Thomas McDougall, Quebec, director and chairman of the Board of Directors, Quebec Bank; director and vice-president, the Shawinigan Water & Power Co.; Theodore W. Cramp, Philadelphia, of Cramp, Mitchell & Shober, bankers; Hon. James M. Beck, New York, ex-Assistant United States Attorney-General; trustee Mutual Life Insurance Co. of New York; director National Copper Bank of New York; William McMaster, Montreal, vice-president and managing director Montreal Rolling Mills, director Montreal Telegraph Co. and the Dominion Iron & Steel Co.; R. H. Martin, New York, president Kings Asbestos Mines; Hugh A. Allan, Montreal, president Montreal Telegraph Co., director Allan Line Steamship Co., Ltd., Merchants' Bank of Canada, Grand Trunk Pacific Railway Co.; C. Hartman Kuhn, Philadelphia, director Girard Trust Co. and Insurance Co. of North America; H. H. Melville, Boston, vice-president Canadian Northern Quebec Railway Co., director Shawinigan Water & Power Co.

#### Production.

Asbestos mining is now the most important mineral industry in the Province of Quebec. The presence of asbestos in the Eastern Townships has been known since 1847, but it was not till 1877, thirty years later, that the deposits were worked. During the last thirty years the aggregate production has had a value of more than twenty million dollars, and at the present time the Province of Quebec produces between 85 and 90 per cent. of the world's supply.







The following returns indicate the growth of the industry. The production of low-grade material was greatly increased by the introduction of mechanical concentration in 1892-3-4:—

| Year.        | —Asbestos—  |              | —Asbestic—  |           |
|--------------|-------------|--------------|-------------|-----------|
|              | Short tons. | Value.       | Short tons. | Value.    |
| 1880.....    | 380         | \$24,700     | .....       | .....     |
| 1881.....    | 540         | 35,100       | .....       | .....     |
| 1882.....    | 810         | 52,650       | .....       | .....     |
| 1883.....    | 955         | 68,750       | .....       | .....     |
| 1884.....    | 1,141       | 75,097       | .....       | .....     |
| 1885.....    | 2,440       | 142,441      | .....       | .....     |
| 1886.....    | 3,458       | 206,251      | .....       | .....     |
| 1887.....    | 4,619       | 226,976      | .....       | .....     |
| 1888.....    | 4,404       | 255,007      | .....       | .....     |
| 1889.....    | 6,113       | 426,554      | .....       | .....     |
| 1890.....    | 9,860       | 1,260,240    | .....       | .....     |
| 1891.....    | 9,279       | 999,878      | .....       | .....     |
| 1892.....    | 6,082       | 390,462      | .....       | .....     |
| 1893.....    | 6,331       | 310,156      | .....       | .....     |
| 1894.....    | 7,630       | 420,825      | .....       | .....     |
| 1895.....    | 8,756       | 368,175      | .....       | .....     |
| 1896.....    | 10,892      | 423,066      | 1,358       | 6,790     |
| 1897.....    | 13,202      | 399,528      | 17,240      | 45,840    |
| 1898.....    | 16,124      | 475,131      | 7,661       | 16,066    |
| 1899.....    | 17,790      | 468,635      | 7,746       | 17,214    |
| 1900.....    | 31,621      | 729,886      | 7,520       | 18,545    |
| 1901.....    | 32,892      | 1,248,645    | 7,325       | 11,114    |
| 1902.....    | 30,219      | 1,126,688    | 10,197      | 21,631    |
| 1903.....    | 31,129      | 915,888      | 10,548      | 13,869    |
| 1904.....    | 35,611      | 1,213,502    | 12,854      | 12,850    |
| 1905.....    | 50,669      | 1,486,359    | 17,594      | 16,900    |
| 1906.....    | 60,761      | 2,036,428    | 21,424      | 23,715    |
| 1907.....    | 62,241      | 2,484,768    | 28,296      | 20,275    |
| 1908.....    | 65,156      | 2,551,596    | 25,239      | 25,829    |
| Totals ..... | 541,105     | \$20,823,382 | 175,002     | \$250,638 |

The prevailing prices of the product have been as follows:—

|           | Crude No. 1. | Crude No. 2. | No. 1 Fibre. | No. 2 Fibre. | No. 3 Fibre. |
|-----------|--------------|--------------|--------------|--------------|--------------|
| 1901..... | \$125.00     | \$80.00      | \$50.00      | \$30.00      | \$16.00      |
| 1902..... | 150.00       | 90.00        | 55.00        | 35.00        | 18.00        |
| 1903..... | 175.00       | 100.00       | 60.00        | 37.50        | 20.00        |
| 1904..... | 225.00       | 110.00       | 75.00        | 40.00        | 22.50        |
| 1905..... | 225.00       | 125.00       | 85.00        | 45.00        | 25.00        |
| 1906..... | 250.00       | 150.00       | 100.00       | 50.00        | 27.50        |
| 1907..... | 275.00       | 175.00       | 110.00       | 55.00        | 30.00        |
| 1908..... | 275.00       | 175.00       | 110.00       | 55.00        | 30.00        |

During the year 1908 the companies included in this consolidation supplied over 65 per cent. of the world's production and about 73 per cent. of the production of Canada.

The amalgamated properties are fully equipped with modern quarrying and milling plants of most substantial character. The mills, most of which are new, have a daily capacity of about 4,500 tons of mill rock. Over five miles of railway owned by the company and equipped with eight locomotives and 220 cars and other equipment, connect the quarries with each other and with the mills. A considerable portion of the towns of Thetford and Black Lake are built on land belonging to the company, and many of the dwellings used by employees are owned by the company.

According to Mr. Obalski, of the Quebec Department of Mines, of the total quantity of asbestos exported,

United States takes 78 per cent., Great Britain 13, and Germany 8.41.

The engineers who reported upon the properties and the proposed consolidation were Mr. E. C. Bacon, C.E., of New York, and Mr. Fritz Cirkel, M.E., of Montreal. Mr. Bacon built the first asbestos mill in 1891, on the old Glasgow-Montreal property at Black Lake. His forte is mechanical engineering. Mr. Cirkel has specialized in asbestos for years. He has written a valuable monograph on the subject, and is now about to bring out a second monograph. His work for the Federal Mines Branch has given him a national reputation.

## BOOK REVIEW.

**General Alphabetical and Analytical Index—Transactions of the American Institute of Mining Engineers. volumes I.-XXXV. (1871-1904), 700 pages. New York, N.Y. American Institute of Mining Engineers, 1907.**

This volume, an octavo of 700 pages, is now ready for delivery. By its aid, any subject treated or alluded to in the Transactions can be instantly tracked. The names of persons, mines, works, towns, etc., have been included; and abundant cross-references and classified sub-headings have been added to facilitate rapid consultation. Thus, the student remembering the name but not the locality, or the locality but not the name, or neither the name nor the precise locality of a gold mine, can find it under "Gold Mines," or under either of the other heads. For a more extended statement of the nature and use of this Index, which is intended specially for the benefit of those who do not possess complete sets of the Transactions, and who consult the Library by correspondence, see the Bi-Monthly Bulletin for September, 1907. The price of the Index bound in cloth is \$5, delivery charges prepaid. Half-morocco binding costs \$1 extra.

## EXCHANGES.

**The Iron and Coal Trades Review, April 16, 1909.—**

The Review, glancing over the world's iron ore trade, has this to say about Canadian enterprises in Brazil: "Brazil is still undeveloped, but when the time comes for more active exploitation of the fields it will be found that the best deposits have been picked up and are no longer available at tempting prices. It is fortunate, however, that the Brazil deposits have largely passed into Canadian or English hands." Reference might have been made by the Review to New Brunswick, Nova Scotia, Ontario, and British Columbia as future sources of iron ore supply.

**The Engineering and Mining Journal, April 24, 1909.**

—Referring editorially to the general subject of conservation of natural resources, our contemporary dwells upon the function of government officials in this direction. "The Government (United States) itself has an excellent opportunity to lead and show the way by reducing extravagances in its own affairs. Among minor matters it might cease undertaking to teach us how to gasify coal, operate gas engines, and burn coal under boilers without smoke, and otherwise, multiplying unnecessarily the standard, but long-existing, literature of engineering. The matter of economy in production may safely be left to the engineers of the



country. Government officials can no more show them how to improve their methods of mining and smelting, extracting coal, etc., than they can teach their grandmothers to suck eggs."

#### The South African Mining Journal, March 20, 1909.

—In this number is a report of the Stope Drill Elimination Trials. The surface elimination trials, the first competitive test to which all entries were subjected, lasted for four weeks. Drills were entered from nearly all the chief mining countries of the world. The object is to determine the best stoping drill for Rand conditions. In average inches drilled per minute, average cubic feet free air used per minute, and average cubic feet free air used per foot drilled, reciprocating machines won the highest place. But hammer-drills ran a close second, and displayed some advantages that may overbalance the slight disadvantage in efficiency.

Throughout the trials it was evident that a jet of water through hollow steel makes the best dust allayer. Only two machines drilled over  $2\frac{1}{2}$  inches per minute of total time.

**Mining and Scientific Press, April 17, 1909.**—Legislation limiting a day's labour to eight hours is making headway in the Western States. Our contemporary has something to say on the point that the movement is based, not upon the merits of a shorter day's labour, but upon false reasoning that attributes to mining and metallurgic work exceptional unhealthfulness. "Personally," says the Mining and Scientific Press, "we do not believe that the peril of silicosis in a gold mine is greater than the danger of infection by many diseases from the street dust we complacently tolerate in our cities; we would prefer the risk of the miner to that of the motorman or city teamster. . . . The real question is a shorter day's labour for the workingman, but it were wiser to fight it out fairly on its merits, or else to construct police regulations operating equitably on a basis not limited to single industries."

#### PERSONAL AND GENERAL.

Dr. A. E. Barlow, after giving evidence before the Mining Committee, spent a day in Toronto.

Mr. Joseph Houston, of the Right of Way mine, has been appointed consulting engineer for the Nipissing Mining Co.

Mr. Bruce R. Warden, engineer to the Nicola Valley Coal and Coke Company, has returned from a trip to England.

Mr. J. W. Bryant, one of the Tyee Copper Company's engineers, has returned to Victoria, B.C., from a trip to Mexico.

Mr. Selwyn G. Blaylock, superintendent of the St. Eugene mine, East Kootenay, B.C., is back from a trip to the Province of Quebec.

At Lake George, York County, New Brunswick, an antimony smelter has started operations. The Lake George ore is first subjected to concentration.

Mr. J. D. Hurd, of Fernie, B.C., general manager of the Crow's Nest Pass Coal Company, is on a business visit to Chicago, St. Paul and other places.

Mr. Frank A. Ross, manager for the Daly Reduction Co., Hedley, B.C., has returned to the property from New York City, where he was on company business.

Mr. Chas. Emmerson, manager of the mines of the West Canadian Collieries, Ltd., recently left Bellevue, Alberta, for a three months' trip to the Old Country.

Mr. H. E. West, who has spent the winter at Cobalt, is leaving for El Oro, Mexico, to rejoin the staff of R. M. Raymond, general manager of El Oro Company.

Mr. R. E. Harris, president of the Nova Scotia Steel and Coal Company, sailed for Europe in connection with the financial reorganization of the company.

Mr. J. M. Ruffner, manager of the North Columbia Gold Mining Company, of Cincinnati, Ohio, has gone north to operate the company's hydraulic gold mines in Atlin, B.C., for the ensuing season.

Mr. J. J. Harpell has returned to Toronto after an extended tour through Great Britain and Europe. Mr. Harpell's mission was to investigate the trans-Atlantic mineral markets, especially to discover the probable demand for the products of Canadian mines.

Mr. G. A. McCarthy resigned recently his position as chief engineer of the Temiskaming and Northern Ontario Railway to become superintendent of construction of a new power company, which will supply electric power to the Cobalt mines.

A committee representing the Canadian Mining Institute appeared before the Commons Committee on Mines and Minerals, April 21st. They suggested that the administration of all mineral lands be transferred from the Department of the Interior to the Department of Mines. Surface rights, they argued, should be separated from mining rights. The members of the committee were Dr. A. E. Barlow and Messrs. B. A. C. Craig, J. M. Clark, and J. B. Tyrrell.

The Mining Committee of the Federal House is composed of the following members:—Messrs. Blondin, Boyce, Burrell, Chisholm (Antigonish), Congdon, Conmee (Chairman), Devlin, Goodeve, Herron, Lanctat (Richelieu), Loggie, Lortie, Macdonald, McCarthy, McCoig, McIntyre (Strathcona), McMillan, Maddin, Prowse, Rhodes, Smith (Nanaimo), Smyth, Stratton, Templeton, and Turriff.

Travellers will find the new form of Travellers' Cheque now being sold by The Canadian Bank of Commerce a great convenience for obtaining money away from home or in foreign countries. They can be bought at any office of the Bank for sums of \$10, \$20, \$50, or \$100 as may suit the purchaser. Hotels and banks everywhere in the civilized world will cash them, and no dispute can arise as to identification or the amount of money which the traveller may expect to obtain for them. On the face is printed the sum in the principal European currencies which the holder is entitled to receive, and in Canada and the United States they pass everywhere at par.

At the regular April meeting of Council of the Canadian Mining Institute the following gentlemen were elected to membership:—Members—Barney, Wm. G., Latchford, Ont.; Bourne, F. J., Cobalt, Ont.; Glendinning, Geo., 142 Dowling Ave., Toronto, Ont.; Neelands, E. V., Hargrave Silver Mines, Ltd., Cobalt, Ont.; Vance, J. F. C. B., 411 Nelson St., Vancouver, B.C. Associates—Barthe, L. H., Cobalt, Ont.; Campbell Amos, Quebec, Ont.; Drury, Chas. LeB., 122 Wellington St. West, Ottawa, Ont.; Machin, H. A. C., Kenora, Ont.; Morrison, G. F., 401 Traders Bank Bldg., Toronto, Ont.; Pellatt, Sir Henry M., A.D.C., Toronto, Ont.; Perault, Ovila S., 900 St. Antoine St., Montreal, Que.



On Monday evening, April 19th, a small mining boom occurred in the neighbourhood of Elm Avenue, Rosedale, Toronto. A number of mining men had received a week's notification that certain conditions could have to be met before claims could be staked.

Twelve prospectors succeeded in staking and recording one claim each. The assessment work was varied. Much moisture was encountered on several of the claims. Only one valuable discovery was made, and that one disappeared before April 20th.

## CORRESPONDENCE.

To the Editor of the Canadian Mining Journal.

Dear Sir,—In your issue of March 15th I read with great interest your preliminary note on the electric melting experiments conducted by J. W. Evans, and am surprised to find—

“Mr. Evans built a 2,000 Kilowatt Alternating Current Generator and Exciter, the power supplied to run them being furnished by a 5 h.p. gasoline engine.”

Probably the reader's surprise was no greater than that of our friend, Mr. Evans, who has never, so far as we know, sought distinction in the field of electrical engineering and construction.

Mr. Evans' friends have all been looking forward to remarkable results from his researches, and had implicit confidence that he would add much to our knowledge of this work, but we were astonished to learn—as he must also have been—that during the past winter a 2,000 kilowatt, or approximately 2,700 horse power generator, had been constructed in his laboratory.

While this in itself would have been an engineering achievement of much note, it loses interest beside the fact that we see he has been able to transcend so far what we have heretofore considered natural laws that he has driven this huge machine with a 5 h.p. gasoline engine. Such results would be most gratifying if you have correctly reported the situation, and apparently the power field may be revolutionized at any time.

The Journal has always been the exponent of conservatism in figures, but this time it looks as if some one on the staff must have been listening to prospectors who have sold their claims for so many millions that figures lost all significance to a dazed mind.

Just what was the Journal trying to say that Mr. Evans did do. Yours truly,

H. R. KIRKPATRICK.

Toronto, April 16th, 1909.

### RECIPROCITY IN COAL.

To the Editor of the Canadian Mining Journal,  
Toronto, Canada.

Dear Sir,—On both sides of the line the question has been revived in an acute form, of interchange between the two neighboring countries of the most important article of commerce—coal. I expressed my views upon the subject in an address which I gave last year to the students of the Kingston Mining School. I said:

“On our continent the railroad has proved the greatest nation building instrument, provided there by a vigorous and honest human force to use it. This has been abundantly proven in the United States, and the history of the Canadian Pacific is a further confirmation of it. Without the railroad running from ocean to ocean, the Confederation would have been a hopeless failure, and the North-West would have been still a great buffalo range.

“When we look upon the railroad from a miner's point of view, it is one of the greatest forces for na-

tional unity that exists. Statistics express this. If you take the different classes of freight carried by the railroads of the United States you will find that while the volume of each differs slightly in different sections, the average is as follows:—

|                              |        |
|------------------------------|--------|
| Products of Agriculture..... | 8.56%  |
| Products of Animals .....    | 2.32%  |
| Products of Mines .....      | 53.09% |
| Products of Forests .....    | 11.34% |
| Manufactures. . . . .        | 14.81% |
| Merchandise. . . . .         | 4.06%  |
| Miscellaneous. . . . .       | 5.92%  |

“This means that the products of the mines are necessary to support the railroads, and that, on the other hand, the mines could not possibly exist without the aid of the railroads. They are, therefore, mutually dependent one on the other. But when we look into the movement of the principal article carried, namely, coal, of which there were mined in the United States last year 470 million tons, we recognize the political importance as much as the industrial importance of this branch of national industry. Before the war the country was divided into two bitterly hostile camps of protectionists and anti-protectionists. The South demanded free trade, in order to feed and clothe her slaves cheaply. New England, being then the only manufacturing section, as vehemently demanded high protection. At that time the West consisted of the states, now composing the easternmost section of the Middle West, devoted to farming alone. With the development of coal mining and the expansion of the railroad system, all this has changed. The South is manufacturing its own cotton, and turning cotton seed into oil and other by-products, as well as creating the second largest centre of the iron manufacture on the continent. And the West, with Chicago in the lead, is rapidly outstripping New England, and its manufacturing energy is almost exceeding its agricultural activity. New England is, in fact, making less progress than any other section of the country, and why? Because she has no coal. Transportation cost has been so reduced that she can supply herself from Pennsylvania—400 to 500 miles distant—with this indispensable commodity. But coal lies nearer to her hand than Pennsylvania, and this fact is influencing her political position towards this country, and creating in New England alone a strong reciprocity sentiment. When we look at home we find that two provinces—Ontario and Quebec—the most populous and the richest members of the Confederation, suffer from the same complaint—lack of fuel; and yet across the lake in Pennsylvania and Ohio there is such abundance of this very life blood of industry that in order to reach it 30,000,000 tons of iron ore are brought to their coal fields from mines to the west of distant Lake Superior. In fact, Ontario is nearer fuel than the seaboard of Pennsylvania itself; but is cut off from this indispensable agent to the full development of her industrial life by a political line



drawn through the centre of the St. Lawrence, and of Lakes Ontario and Erie. If more reasonable international trade policies were adopted, and the continent's resources as a whole were utilized by its people as a whole, certain industrial disabilities on both sides of the political line would immediately disappear. Nova Scotia would supply New England by cheap ocean navigation alone; and Pennsylvania and Ohio coal would be transported across the lakes to Ontario. Montana, Idaho and Dakota, especially Montana and Idaho, for their smelting operations, need coke, which the Crow's Nest coal fields of British Columbia can supply in full abundance; while the Pacific Coast States must draw their coke from coal fields 2,000 miles distant, either across the mountains, or by boat from Vancouver, unless they prefer to import it from New South Wales.

"It seems almost incredible that two industrious peoples should set at defiance the first laws of economic science, and allow sectional political interests and prejudices to stand in the way of what is so conspicuously to the interest of both."

The coal deposits of Cape Breton and Nova Scotia enjoy the unique advantage of being actually on the seashore, and, therefore, being able to use the ocean and the river as the great highway for the distribution of their products. The effect of the reciprocity treaty of 1854 showed what a beneficial influence the removal of trade restrictions in the United States had upon the coal mining industry of Nova Scotia by raising the output from an insignificant figure to 500,000 tons a year. The present output of 6,000,000 tons is small when compared with the geographical position which the maritime coal fields hold to the markets of the northern section of the Atlantic seaboard. Were trade restrictions removed, I have no doubt whatever that the output would increase by leaps and bounds—not in hundreds or thousands—but in millions of tons. It cannot be doubted but the beneficial effect upon every industry in Ontario of the free importation of Pennsylvania and Ohio coal would be incalculable. There may seem to be some good selfish reason why the coal miners of Pennsylvania and Ohio should object to the introduction of Nova Scotia coal to New England factories; but it is strange short-sightedness on the part of the coal miners of Nova Scotia to refuse to exchange the limited market which they have on the St. Lawrence for the unlimited market which the North Atlantic seaboard states would offer them.

Yours truly,

JAMES DOUGLAS.

99 John Street, New York, April 6, 1909.

### THE LUMBER SITUATION IN GOW GANDA.

To the Editor of the Canadian Mining Journal.

One of the most important requisites, in the development of a mining camp, is plenty of lumber. Now, Gow Ganda has been most abundantly provided, by nature, with the best of the forest trees, pine and spruce, yet man has decreed that, in regard to cheap lumber, it shall be no better off than an inaccessible desert region devoid of forest growth.

Gow Ganda is in an extensive timber reserve, called the Temagami Forest Reserve. In this area the white pine is reserved in perpetuity. The pulpwood, spruce, balsam and other timber belongs to J. R. Booth & Co., having been bought from the Ontario Government many years ago at a low price.

During January of this year, a man named Knowles took a complete saw-mill outfit into Gow Ganda and started cutting timber. This green, rough lumber found an immediate sale at \$45 to \$55 per thousand feet. A week or two after starting operations, orders came that all cutting of timber must stop, and building operations were at a standstill in Gow Ganda till about March 10th. Then the mill started up again, although the cutting of timber for cabins was prohibited. Now, however, \$60 to \$75 per thousand feet was charged for the different grades of lumber, and it developed that Knowles was not allowed to cut any spruce by the J. R. Booth Co., and was charged the exorbitant amount of \$18 per thousand board feet, on the stump, by the Government for the pine.

Now conditions and expenses of running a saw-mill at Charlton and Gow Ganda are practically identical, if anything conditions favor Gow Ganda, as even the slabs and sawdust find an immediate sale at good prices. Yet at Charlton the mill owners can cut and sell, presumably at a profit, lumber for \$17 per thousand. At Gow Ganda the same grade costs \$70. The cost of transportation between Charlton and Gow Ganda by sleigh is about \$50 per thousand feet.

One can hardly blame the Gow Ganda mill-owner for charging a good price for his lumber, but the action of the Government is inexcusable. Besides charging a reasonable stumpage fee, they should expropriate some of the holdings of the J. R. Booth Co., whose refusal to sell is hampering the development of the country. This may seem to be an unwarrantable interference with vested interests, yet under the circumstances it is justifiable. The only difficulty is that the Government has shown such an example of greed, in its dealings with Gow Ganda interests, that it would be hypocrisy on its part to dispossess private citizens for the same fault.

One can only regret the terrible forest fires which are inevitable in that district this summer. Prospectors should realize the wicked waste they are guilty of in setting fire to large areas of fine timber, under the fallacious idea that it helps prospecting. The fire rangers in the district will have more than their hands full coping with fires due to accident and carelessness, but when fires are deliberately set out their efforts will be useless, and instead of a forest reserve there will be a desolate brule.

JAMES D. CUMMING.

113 Bedford Road, Toronto.

### A REPLY TO MR. T. A. RICKARD.

To the Editor of the Canadian Mining Journal.

Sir,—I have read with great interest Mr. Rickard's letter, in your last issue, concerning his report on Gold Mining in Nova Scotia, which was made by him on behalf of the Nova Scotian Government.

I happen to have been a member of the committee of the Mining Society of Nova Scotia referred to by Mr. Rickard. I was unable to take any active part in selecting a mining engineer to make the investigation, having been absent from the Province, both when Mr. Rickard was selected, and during the period of his investigation. At a later time I had the privilege of reading Mr. Rickard's report. I am unable to speak as to the official attitude regarding this report, and as to views of other members of the committee, and, therefore, am only stating my own personal opinion.



I was very much surprised to see that Mr. Rickard had either misunderstood, or had gone beyond the scope of what I had supposed were the original bounds of his investigation, as first discussed. As I personally originated the movement for this investigation, I may be allowed to speak as to its purpose.

It was intended that the Nova Scotian goldfields should be looked over, all data bearing on supposed similarity to Bendigo gold occurrence noted, as also the dissimilarities, and suggestions and advice given as to future developments. This part of report was fully carried out. The points to which I personally take exception, and which, in my opinion, rendered it impossible to publish the report, at least in the form in which it was submitted by Mr. Rickard, were the almost personal criticism of individual resident man-

agers, and the opinion stated with regard to a gold mine that was in active operation. Mr. Rickard had a perfect right—as a private individual—to form his own judgment on any mining operation coming under his view, but placed, as he was, in a semi-public position, such an opinion could hardly fairly be published.

I think Mr. Rickard will agree that a government official (even a temporary official) is not expected to express opinions for publication as to methods, values, or in any way directly affecting the status of a mining company, particularly a going concern.

I have no doubt that other members more conversant with the whole matter will more ably state their side of this question.

Yours faithfully,

GEORGE H. GILLESPIE.

Madoc, Ont., April 22, 1909.

## INDUSTRIAL PAGE.

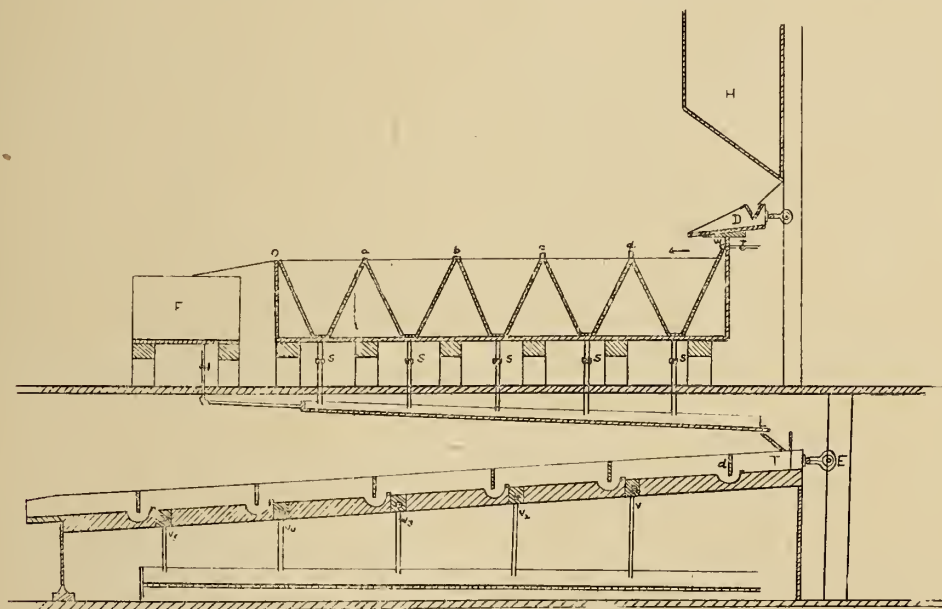
### THE BEHREND WET FLOTATION AND CONCENTRATING SYSTEM.

#### I.

In the concentration of ores by the ordinary wet methods, it is an accepted fact that the losses that take place with many ores are due mainly to the nature of the mineral constituents being flaky and scaly and characterized as sectile which float upon the surface of the water. This float, due to its scaly nature, does not become thoroughly wet and is, therefore, irrecoverably

After many years of careful experimentation, Mr. Samuel K. Behrend, the inventor of the Behrend Dry System of Concentration, has evolved and invented a most complete method for the economical treatment and handling of these ores.

In this method of treatment, which consists essentially of feeding dry crushed ore upon a current of water, floating away the fine rich mineral, recovering same by filtration or some similar method and reconcentrating the tailings on a shaking table or trough of special construction, the losses are reduced to a



Wet Flotation and Concentrating Table—Behrend System.

lost by being carried away in the drain. Among the ores that this is particularly true of are graphite, galena, stibnite, chalcopyrite, tetrahedrite, sylvanite, molybdenite, argentite, stephanite and native silver. In the concentration of these ores, losses vary from 35 per cent. to 65 per cent. of the original mineral constituent.

Many methods and devices have been proposed and tried in the endeavor to overcome and cut down these losses, but up to the present, all have been unsuccessful.

minimum; in most cases a recovery of over 90 per cent. being readily secured at extremely low cost of operating.

By referring to the sketch, it is seen that the ore is fed from the hopper H on the distributor D, which delivers a steady stream of ore upon the surface of the water introduced at W in the tank below and travels in the direction shown by the arrows. At the same time a downward current is induced by having the spigots S open to such an extent as to allow the tailings to be discharged, and permit a minimum of

water to be discharged at O into the settler or filter F. Owing to the nature of the material, the gangue, together with granulated mineral constituents sink, while the scaly, flaky mineral, is carried forward, meeting obstructions at a, b, c, d, which tear the surface and permits the water to act upon the floating mineral, cleansing the mineral from its impurities and delivering it in practically a pure state to the filter.

The tailings are discharged through the spigots at the bottom into a common launder L, which feeds into the head of the concentrating trough T.

This trough is made up of a series of small compartments, each of which is a concentrating table in itself, equipped with a riffled surface and a valve of special construction. Between each section is placed a ducker (d), which compels every particle of ore to become thoroughly wet. The trough is equipped with an adjustable eccentric E, which imparts to it a rapid reciprocating motion. Means are provided to increase or decrease the pitch of the trough at both ends. The rapid motion of the table stratifies the mineral and permits it to be discharged continuously from the valves  $v^1$ ,  $v^2$ ,  $v^3$ ,  $v^4$ ,  $v^5$ , while the tailings are carried along with the rush of water and discharged from the end of the trough, clean of mineral.

The riffles covering the floor of the trough, are placed on canvas with 1" centres, running from a feather edge at their upper portion to  $\frac{1}{2}$ " high placed across the trough and just in front of the ducker. This permits of a bedding of mineral to be carried at all times, the valves being set so as to permit the discharge of clean mineral only.

As can be readily seen, any mineral escaping the first compartment, is caught in the second; that which escapes the second is caught in the third, and so on down. When the material reaches the discharge end, it must be absolutely clean and free from values.

The first two, three or four compartments will produce shipping concentrates, while the remainder will form a middlings product, to be returned to the head of the table to be reconcentrated.

It is evident that a machine of such simple construction requiring so little power to operate, and having so great a capacity, can be readily adapted to the concentration of mill tailings, it being merely necessary—in most cases—to attach the trough to the tailings launder. A recovery of a large portion of the present losses may be confidentially expected.

**Allis-Chalmers Company.**—This company's Bulletin No. 1433 describes the Allis-Chalmers Prospecting Mill, for free gold ores. The mill consists of a three-stamp battery complete with all framework and equipped with power. It constitutes a light, compact, easily transportable plant. The stamps weigh 250-lb. each. The mill is arranged to be operated in one battery by belt from stamp countershaft. The equipment includes:—

- 1 high mortar, weight 1,000 lb., arranged for copper amalgamation plates in front and back, screen frame seat planed and foundation holes drilled to templet.
- 1 wood screen frame fitted to mortar.
- 2 wrought iron keys.
- 1 steel screen—3 steel shoes—3 steel dies—3 cast-iron heads—3 stems of mild steel—3 tappets—3 double seams—1 heavy-hammered iron cam shaft—2 wrought iron collars—2 heavy corner cam shaft boxes—1 cam shaft pulley—1 jack shaft—2 jack shaft boxes—3 iron sockets—3 finger pieces—1 set of wood guides, and complete frame shafting, water pipes, copper plates, etc.

The power usually furnished consists of 1 three-horse-power combined vertical engine and boiler.

We are pleased to note that one of our advertisers, Messrs. Belliss & Morcon, of Birmingham, England, has just obtained a contract for what we understand is the largest single ventilating fan set in Great Britain. The combination consists of a Belliss triple expansion engine of 1000 B.H.P., running at about 200 r.p.m., and coupled direct to one of Messrs. Davidson & Co.'s sirocco fans of 154-inch diameter. This plant will be installed at the Cambrian Collieries' Mines in South Wales; the engine being similar to two 750-K.W. electric sets put in some months ago in the same collieries for general power and electric work."

Messrs. Laurie & Lamb, Montreal, Canadian agents for Messrs. Belliss & Morcon, Birmingham, England, have recently received an order from the Toronto University for a Belliss Engine for use in the Hydraulic Laboratory of the University. This engine will operate a couple of centrifugal pumps by belt.

## SPECIAL CORRESPONDENCE

### NOVA SCOTIA.

**Glance Bay, April 19.**—The Opening of the 1909 Season.—The Department of Marine at the end of the second week in April reports the Gulf as practically clear of ice, and it looks as if navigation would open quite early. Sydney harbor has been clear of ice for some time past, and a number of the season's charter vessels are arriving in port. The Dominion Coal Company will probably send the first steamer to Montreal about the 20th of April. The prospects are for an average season, and it is not probable that the St. Lawrence shipments from any of the Nova Scotian collieries will exceed those of previous years. The aggregate output of the Nova Scotian coal companies will in all probability be slightly below those of 1908.

The output of the Dominion Coal Company to the end of March amounted to 663,454 tons, which compares with 946,286

tons during the first quarter of 1908, being a decrease of 282,000 tons.

The slackness in trade was alone responsible for the decreased production, and all the other coal companies have been affected in like manner. The thing that has most materially affected the coal sales for this season has been the general feeling of uncertainty as to the actions of the United Mine Workers of America. This uncertainty, coupled with the persistent competition which has been waged against Nova Scotian coals in the Upper Provinces by United States coal operators, has rendered it more difficult for the sales agents of the Nova Scotian coal companies to negotiate their contracts than was ever the case before.

In the present very depressed state of the bituminous coal trade in the United States many of the operators have been



willing, and even glad, to send coal into Canada at a price which has netted them a loss, in order that their mines should not stand idle. Coal sales have been made at prices which net the operators under 90 cents at the pit mouth. It is hardly to be expected that the leaders of the United Mine Workers of America in Pennsylvania will raise any very strenuous objections to an agitation in Cape Breton which enables the Pennsylvania sales agent to push his sales, and provides that energetic gentleman with so useful an argument at the season when contracts are usually renewed. In fact, the disturbance of confidence which has resulted from the agitation raised in Cape Breton by the paid delegates of the United Mine Workers of America has so admirably suited the purposes of the United States coal sales agent in Canada as to bear a distinct resemblance which exists between the effect and the cause. The leaders of the U. M. W. A. are men of sufficient foresight to anticipate the possibility of strained relations between their as yet unrecognized union and the anthracite operators. It is hardly necessary to point out the advantage which would accrue to the U. M. W. A. in the event of a strike in the anthracite country if they were able to put an embargo on Nova Scotian coal shipments to the disaffected region, for in such a case it cannot be doubted that the leaders of the U. M. W. A. would consider that "it would conserve the best interests of the U. M. W. A." to call out the miners in Nova Scotia.

As previously remarked, the reflex of this unfortunate agitation, even if nothing more serious should grow out of it, will be felt when the tonnages for 1909 come to be reckoned up and compared with previous years.

The "Black Diamond," a leading organ of the United States coal trade, commences in its issue of the 10th of April a series of four articles on the "Resources and Characteristics of Canadian Consumers," written by E. B. Osborn, an English writer, who has written a volume on Canada, after close personal investigation. The first article is titled "The Garden of Canada," and is an eloquent appreciation of the wealth and possibilities of Southern Ontario. The remarks with which the editor of the "Black Diamond" prefaces the first article are of very pertinent interest to all who are interested in the development of our Canadian coal trade, and have a weighty bearing on the future prospects of the Nova Scotian. To quote: "With the changes in tariff schedules, and especially with the introduction of reciprocity, more of that coal from Pennsylvania, West Virginia and Ohio is going into the markets of Ontario and Central Canada. It is sure that Canada is awakening industrially, and that her factories and homes will be big consumers of coal before long. The wide-awake coal man will go into that field and lay his foundations for business on the rising tide of our neighbors' prosperity." The metaphor of the last sentence we have quoted may excite amusement, but the meaning of the writer is clear. To use an idiom that needs no explanation, what the writer intends to convey is that the American coal man should "get in on the ground floor." In other words, as we have previously remarked in these columns, the American is awakening to the possibilities of Canada's coal resources, and he is fully aware that unless he can introduce the product of his coal fields into Canada very shortly, the tables will be turned. As yet Canada's coal industry is in the puppy stage, and the American coal man knows it. It is a pity that Canadians are not so fully awake to the wealth of their mineral resources as are their very wide-awake neighbors below the line.

Writing on the general question of tariff laws, an editorial in the Montreal Star refers to the treatment that Canada has received in past years from the United States, and the changed attitude of our neighbors under the altering economic conditions. The Star writer does not think that this country will ever go to the lengths of the McKinley or the Dingley tariffs, and states "All that Canada will do will be to protect her own industries

from submersion and her own natural resources from depletion. And the latter part of this manifest duty she cannot take up any too soon." We think the writer of this editorial correctly interprets the feelings of every intelligent and far-sighted citizen of Canada. Our heritage is vast, but it is not exhaustless. We have not in this Dominion the almost immeasurable wealth that was once comprised in that portion of the North American continent which lies between the 45th parallel and the Isthmus of Panama, and for the sake of our posterity and the mighty nation that is arising in this Dominion of Canada, we should see to it that the shameless waste of national resources which has gone on to the south of us is not repeated here.

**Two Conciliation Boards.**—It was our duty about this time last year to detail the course of events which led up to the appointment of a Board of Conciliation to enquire into a dispute between the Provincial Workmen's Association and the workmen of the Dominion Coal Company, and to chronicle the successful settlement of the dispute through the labors of this Board, under the able chairmanship of Prof. Adam Shortt. Both sides accepted the award of the Board and a contract for two years was arranged between the two parties to the dispute. The general satisfaction which the settlement gave was shown by the numerous addresses of congratulation which were showered upon the Board, and in the Labour Gazette the Deputy Minister of Labour referred to the result as a complete vindication of the Lemieux Act and the policy of the Department of Labour. It was felt that for two years at least industrial peace was assured, and everybody felt that there was good cause for congratulation.

No sooner, however, had the award been accepted than an attempt was commenced to dissipate this general satisfaction, and a local newspaper opened its columns to a series of letters signed "Shotlighter" which stated that the workmen had been duped by their acceptance of the award, and that had the P. W. A. been a stronger and more aggressive organization much better terms might have been wrung from the Dominion Coal Company. These letters made many vague allegations, and were ingeniously calculated to foster a spirit of useless discontent with the terms of the award and more especially with the leaders of the P.W.A. who had executed the two years' agreement. There was a modicum of truth in these letters, inasmuch as the leaders of the P.W.A. had not obtained the best terms possible. Under the terms of what was known as Schedule No. 2 the Company offered their workmen higher wages than were actually granted under the award of the Board of Conciliation, but this schedule was refused by the P.W.A. leaders, who acted under instructions from their lodges. Apart from this, however, there was not the slightest justification for the attempt which was made to rouse discontent with the settlement of March, 1908. It was remarked at the time that the publication of the letters referred to served no useful purpose and would certainly result in future trouble, a prediction which events have fully justified.

It has now become known that these letters were written by persons who have since become prominent adherents of the United Mine Workers of America, and since that time this organization has been endeavoring by every means in its power to spread abroad a spirit of discontent with the present conditions at the mines in Nova Scotia, but more particularly to discredit the Provincial Workmen's Association, and to supplant it by the United Mine Workers of America. During the year just past a heated warfare, embittered by much personal feeling and spite, has been carried on between the adherents of the two rival organizations, which has resulted so far in nothing more useful than an enrichment of the members of the local legal profession. Up to the end of 1908 the Dominion Coal Company were not concerned in the fratricidal warfare of the two unions, in which they would have been acting foolishly to interfere, but at the beginning of this year the



U. M. W. A. induced several subordinate officials of the Coal Company to become members of their union. In doing this they were fully aware of the rule which obtains in all reputable British corporations, namely, that no official can belong to a labor union and retain his official position. This rule is not so rigidly observed in the United States, and indeed it is a part of the constitution of the U. M. W. A. that all workers in or about a coal mine shall belong to the union, with the single exception of the manager, and the "top-boss," whoever that elegantly named individual may be.

The coal company took the ground that no official could be allowed to belong to a labor union and retain his official position, and the option of leaving the U. M. W. A. or of vacating their official position was given to those officials who had become members of that union. Several of these men refused to withdraw from the Union and they were summarily dismissed. Other men were asked to fill the places of the dismissed officials, but they refused, and in several instances large numbers of men were laid idle owing to the impossibility of getting men to fill the vacant places. This is the discrimination complained of by the U. M. W. A. and it is the essential point on which that organization has taken issue with the Coal Company.

A Board of Conciliation was appointed by the Department of Labor to enquire into this matter. Reference was made in previous correspondence to the peculiar nature of the constitution of the Board, inasmuch as one of the members was the local president of the U. M. W. A. We venture the opinion that the repetition of an appointment of this character will bring the Industrial Disputes Act into a well-deserved disrepute. The essential principle laid down by this act is the constitution of an independent and fair-minded tribunal, which shall bring the dispassionate and detached viewpoint of an uninterested third party to the consideration of a dispute between two parties. Neither of the parties to a dispute are usually capable of an unbiased view of the matter in dispute, particularly when the disagreement arises between such supposedly antagonistic forces as capital and labor. That capital and labor are antagonistic we do not admit, but it is a popular delusion that they are. It has been found in the working of the Lemieux Act that even in the most bitter disputes there have been found possibilities of conciliation, and it has also been found that the frank discussion of matters in public before a semi-judicial tribunal has allowed a much needed escape-valve, and has in many cases resulted in increased respect of the opponents for one another. Before these boards many a workman has found that his master was not half so black as he was painted, and many an employer has been compelled to respect the manner in which his workmen presented their arguments. But this desirable state of affairs can only be brought about where the Board is composed of men entirely separated from any connection or interest in the matter under discussion.

In the case of the present Board of Conciliation two members of the Board have filed a report, in which they find that the evidence placed before them did not prove any discrimination against the United Mine Workers by the Dominion Coal Company as was alleged by the U. M. W. A. in their application for the Board, and the majority report further states that under the existing contract with the Provincial Workmen's Association the coal company could not have done otherwise than refuse to recognize the U. M. W. A. The finding is in fact a complete vindication and support of the position which has been consistently maintained by the Coal Company.

Mr. MacDougall, the third member of the Board, and the local president of the U. M. W. A., has filed a minority report disagreeing with the other two members of the Board. How could it be otherwise? As president of the U. M. W. A., Mr. MacDougall could not very well pass a practical vote of censure on the actions of his own organization. In a word, the

position of Mr. MacDougall as a member of the Board of Conciliation appointed to enquire into an alleged dispute between the Dominion Coal Company, and the U. M. W. A. was not compatible with his position as the president of that Union in his district.

Mr. MacDougall's acceptance of a position on the Board is also not in consonance with the policy of his organization. At the recent convention of the United Mine Workers at Indianapolis, a resolution was passed condemning utterly the principle of the Canada Industrial Disputes Act. The resolution stated that on the advice of Canadian members of the Union the U. M. W. A. should resist with all their power any attempt at similar legislation in the United States. The Canadian brethren informed the delegates that the reports which had been sent abroad of the beneficial effects of this Act, were false and misleading. The Convention pledged itself to resist any proposed legislation based on the Lemieux Act, and expressed itself as being utterly opposed to any law which would take away from the workmen the right of strike, or which sought to impose any restrictions on the methods of calling a strike.

In the face of this resolution, the action of the Department of Labor in appointing the president of a U. M. W. A. local as a member of a Board of Conciliation under the Lemieux Act, to adjudge a situation brought about by the actions of that same union, is not without humor, especially when it is realized that the mission of this Union in Nova Scotia so far has been to attempt destroy and disrupt a Canadian organization of 30 years' standing, to injure the coal trade in no small degree, to destroy the effects of the Board of Conciliation of 1908, and to aid the American operators in obtaining possession of markets which are ours by law and by right.

#### ONTARIO.

**Cobalt.**—Mr. H. D. Simms, who has the contract for constructing the plant of the Hydraulic Compressed Air Co. at Ragged Chutes, has 310 men at work. Part of this force is being used to complete the electric power installation below the compressed air plant, while the rest are getting ready the transmission poles, and pipe line and carrying on the underground work. About half a mile of the pipe line has been welded and the right of way for the pipe and transmission lines has been cut. There are two intake shafts which will be 330 feet deep and 8½ feet in diameter. These will be cement lined. The outlet shaft distant a thousand feet from the intakes is twenty-four feet square and 298 feet deep. The difference in elevation between the collars of the intake and outlet shafts is 54 feet. The tunnel connecting the shafts will be approximately 10 feet square with enough space above the water line to hold 100,000 cubic feet of air. A small incline shaft at an angle of 45 degrees will be run from the top of the tunnel at the lower end to the outlet shaft. This will carry the air to the 20-inch main which will be cemented into the upper end of the incline shaft. The company expects to supply power in July.

Work at the Buffalo is being carried on steadily and excellent progress is being made. The underground workings are being pushed and large amounts of ore blocked out. The concentrating plant erected on the property is treating about 30 tons of ore a day and the extraction is said to be 85 per cent of the silver contents. A cyanide plant to be run in connection with the present mill has been erected and it is expected that when the plant is in operation the percentage of extraction will be naturally increased.

The Amalgamated has started work again with a small force of men.

Active development work is being carried on by the Nipissing on their different properties. About 400 feet of drifting has been done on the Kendall vein at the south end of the lake



and the vein shows up well in the shaft at a depth of 145 feet. The big vein recently discovered in the No. 64 shaft, near the Mismaming & Hudson Bay is being drifted on. The ore body appears to be in the form of a chimney and dips off to the west. The shaft will be sunk another hundred feet before much drifting is done. On the Fourth of July vein a station is being cut at the 200 foot level preparatory to stoping. The shaft on the Meyer vein is down over 80 feet and considerable development work has been done at this level. The company has never been in a better position financially and the amount of the reserves is large.

A large force of men are at work on the La Rose and a great deal of development work is being done. The finding of values between the 100 and 200 foot levels on the No. 1 vein will add considerably to the ore reserves. At the 100-foot level a large amount of drifting has been done and the vein found to be very constant. While drifting on the 200-foot level the vein was encountered and it shows good values. A raise has been started from the lower level and will be continued to the 100-foot level.

Later developments have proved that the new vein discovered on the surface near the No. 16 shaft of the O'Brien mine, is the same as is being worked from the crosscut at the 100 foot level. It has been opened up at several places on the surface and high-grade ore found at all points. This block of ore will add largely to the reserves of the mine. It is expected that the big new concentrator will be ready to start some time in June. There are a number of shafts located at some distance from the mill. Another an electric road will be put in to handle the ore for the mill. A cyanide plant will be used in conjunction with the concentrating plant and it is expected that a saving of 95 per cent. of the silver values will be effected. Electric power will be used to run the mill.

About 110 men are employed in the mine and mill of the McKinley-Darragh. During the coming summer the No. 7 shaft will probably be sunk to greater depth. The shaft on the Lake in has been sunk to a depth of 250 feet. This summer the No. 2 shaft will be put in shape and sinking will be resumed. The concentrating mill is running steadily and putting through 65 tons of ore daily.

The new shaft sunk by the La Rose on the University property is now down 105 feet, and a station will probably be cut at this level. The vein at the bottom of the shaft has split into several small stringers but the wall rock is well mineralized.

About sixteen men are working the Silver Leaf Mine. Recently while drifting toward the Foster property a small vein carrying good silver values was discovered. This new find is being developed.

The management of the Alexandria Mine, which adjoins the Bailey on the west, intend to install a diamond drill to be operated at the 170-foot level of the shaft. It is expected that the hole will cut the Bailey No. 2 vein, which lies about 60 feet to the west of the shaft. The new compressor which has been ordered will not be installed until the roads are in better shape. A new 6-inch vein of calcite was discovered on the surface on April 12th.

A contract has been let by the Bailey Mining Co. for sinking a 200-foot shaft, and 200 feet of drifting. The management also intends to let a contract for several thousand feet of diamond drilling. This property was formerly worked by the Cobalt Central under a lease which expired on April 1st. The Cobalt Central developed two good veins on the Bailey, and the latter property will undoubtedly become an independent shipper in a short time.

It is interesting to note that the workings of the Big Pete mine, of the Cobalt Central have gone through the diabase to the lower Huronian slates, and they have already encountered two strong veins in the latter formation. This will have

an important bearing on all the properties on Diabase Mountain, notably the Silver Mountain, Alexandria and the Bailey.

The Green-Meehan Mining Co. will be taken over by the Consolidated Silver Cobalt Mines Co., which has a capital of 3,000,000 shares of a par value of \$1.00. The shareholders of the Green-Meehan will receive 1,500,000 shares of the capital stock of the new company. Work will be started as soon as possible.

A diamond drill is to be installed at the Victoria Mine, adjoining the Watts property. Holes at an angle of twenty-five degrees will be bored from the 150-foot level of the No. 4 shaft.

The Silver Cross Mining Co. will issue 15,000 shares of the treasury stock to pay for the installation of the plant and to provide for future developments.

A station is being cut at the 120-foot level of the shaft at the Cochrane Mine.

A meeting was held in Buffalo on April 14th for the purpose of organizing a new company to take over eleven properties in South Lorraine. The properties to be included in the merger are known as the Hill Claim No. 7323. Eshelman claims Nos. 10234 and 9934, Eckerson claim No. 10968, Ross claims Nos. 7305, 9153 and 9154, Lapey claim No. 10612, Heling claim No. 10957, Hill claim No. 10644 and Stowe claim No. 11257. The new company will probably be known as the South Lorraine Mines, Limited, with a capitalization of 1,500,000 shares of a par value of \$1.00 each, 400,000 shares of which will remain in the treasury.

Mr. Joseph Houston, of the Right-of-Way Mine, has been appointed consulting engineer for the Nipissing Mining Co.

The United States Steel Corporation whose engineers have been testing the iron ore deposits on the west side of the Temagami Lake, have stopped their work in that locality.

The shaft of the Moosehorn Mine in James Township is now down 100 feet and will be continued to the 125 foot level, at which depth the vein will be drifted on and cross-cuts run to tap the veins which have been discovered by surface prospecting. The sinking of the shaft to the 125 foot level will be done on contract and when that is completed the work will be taken over by the company.

A plant has been ordered for the O'Brien Mine in the Miller Lake District by Mr. J. B. Woodworth, consulting engineer for Mr. M. J. O'Brien. It will consist of boilers and a six-drill Rand compressor.

Good progress is being made in the development work of the White property at Maple Mountain, situated about 30 miles to the northwest of Cobalt. This property is largely owned by the Canadian Ores Co. whose shares are largely held in England. A plant consisting of a 9-drill Rand compressor, a 12 x 16 hoist, boilers, dynamo, etc., has been installed and will probably be in operation before the end of April. A shaft has been sunk to a depth of 150 feet between two veins which show good silver values at the surface. At the 75-foot level, cross-cuts were run to tap the veins which showed up well at this depth. An open cut has been started on one of the veins and is 20 feet deep and good silver values are found. A carload of ore has been sacked ready for shipment. Active development work is being undertaken by the mines in this locality and the district is likely to have a good future before it. Good showings have been located by the Darby Mountain Mine and Le Roy Claims. A plant has been installed by the Maple Mountain Mining Co..

The plant of the Wettlaufer Mine in South Lorraine will hardly be in operation before the end of July. The cost of installation will be about \$15,000 while the camp buildings will cost an additional \$6,000. The shaft is down 40 feet on the vein which showed native silver at the surface. At the bottom of the shaft the vein is of good width and carries good values while the wall rock is also well mineralized. About \$5,000 worth of ore was taken out while sinking the shaft the first 30 feet.

A line of motor boats will be put on the Montreal River this spring to operate between Latchford and Elk Lake City. The



operating concern is the Richardson Navigation Company of Toronto. The boats will be 40 feet long, lighted by electricity and fitted up in the most commodious manner. It is expected that they will make two trips a day between the two towns.

The winter road to Gowganda is now practically impassable and the new districts will be cut off from communication with the outside world for the next few weeks. The slush on the lakes is knee deep and going in on foot is attended by considerable danger.

### BRITISH COLUMBIA.

**Boundary.**—The Greenwood Miners' Union has made application for the appointment of a Conciliation Board, to work under the Lemieux Act in adjusting some difference which they say exists between themselves and the British Columbia Copper Company. It seems that some friction has arisen in regard to the laying off of several men; there also seems to be a difference of opinion anent the proposed reduction of 10 per cent. in the wage scale. The district officers of the Miners' Union claim that no such offer was made with proper authority. If the coal strike in Southern Alberta continues, however, they will all get a chance to sit down and think the matter over, as the British Columbia Copper Company gets its coke supply from Coleman, Alberta, and already the regular supply is shut off, making it necessary to cut in on the reserve supply, which cannot possibly last more than ten days or a couple of weeks. Even if the coal strike were settled almost immediately, it would take about two weeks to get in another supply of coke, so it would seem that a short shut-down is inevitable for the Copper Company.

It is not likely that the Snowshoe mine or the Trail smelter will be affected, as the Consolidated Company is securing its coke from the Crow's Nest Pass Coal Company, who have signed a satisfactory agreement with their men. The Snowshoe shipments for the week ending April 10th amounted to 2,950 tons, which was the heaviest output for some time.

The outlook in the Grand Forks district is exceptionally good, and there is a large amount of development work going on. Quite a number of transfers have also been made during the last week or so. The Golden Eagle, on the North Fork, is getting out regular shipments of ore, having sent out 60 tons during the past week. A party of mining men have been looking over the Yankee Girl, on Hardy Mountain, which is a high-grade property. The property has not been worked for about nine years, when it was last operated by Major Leckie.

At the Granby smelter 16,420 tons of ore was treated during the week with six furnaces, two more now undergoing the enlarging process. The two furnaces that have been enlarged are giving good results, and the work of so fitting up the balance of the battery will be rushed through as soon as possible. The Granby, in addition to treating the ores of its own mines, is smelting ore from the Republic, Surprise, Lone Pine in Washington and the Golden Eagle on the North Fork of Kettle River. The ore from most of these mines runs from \$30 to \$40 per ton, with the exception of the Republic, from which some fairly rich ore has been taken, but in small quantities, comparatively speaking.

Despite the many drawbacks that the mining industry seems doomed to contend with, it is evident that the output of the Boundary mines for the present year is going to exceed that of 1903; at any rate, this has been the case so far this year, the shipments showing an increase of about 137,000 tons, or nearly 50 per cent. over the output for 1903 during the same time. The Granby, of course, while it shipped heavily, was practically the only shipper last year, and while their output has fallen off a little during the the same time this year, still the output of the Oro Denoro, Snowshoe and other mines has more than made up for this difference and the increase as well.

The citizens of Greenwood passed the bonusing arrangement with the promoters of the tunnel-tramway enterprise by a heavy majority, and as a consequence work has already been started in the way of putting in the seven-drill air compressing plant, blacksmith shop, etc., at the site of the mouth of the proposed adit, which will be on the Strathmore claim, on which seven very rich veins of gold-silver ore have been worked to some depth. It is estimated that in the first section of 6,000 feet the bore will pierce 17 high-grade veins of ore of varying width. Over 8,000 tons of ore has been shipped from this locality that has averaged over \$100 per ton, but as it has cost over \$40 per ton to mine most of this and about \$15 for freight and smelter charges, there has not been very much in it for the owners, working without co-operation, as they have been. The present movement, however, more on a basis of co-operation, will no doubt prove a benefit to all of these nascent mines, among which may be named the Strathmore, Defiance, Yellowstone, Don Pedro, Idol and Crescent. The lode in the latter claim will be cut in the vicinity of 6,000 feet into the hill at a depth of approximately 1,300 feet. The No. 1 vein of the Strathmore will be tapped 800 feet into the hill. It is expected that this consolidation will be able to reduce the cost of mining here to about \$10 per ton and haulage and treatment to \$7 or \$8 per ton, so that it will be possible for the combined organization to make a good profit on their venture. The tramway-tunnel will be made large enough to take out 10,000 tons per day, if necessary, which, of course, it will be when the shipping of Phoenix ore begins—the tunnel ever gets in that far. And the chances are good now that work has actually been commenced.

The Crescent mine has been leased by J. Finlay & Sons, who will shortly begin work. This property has already produced over \$20,000 of high-grade ore.

**Nelson District.**—Shipments have once more been resumed from the Silver King mine, 303 tons having been sent to Trail smelter last week. This property is now unwatered to the seventh level, and there are forty men at work in the mine. It is not the intention to unwater the three lower levels to the 1,000-foot level just now, but there is no doubt that if the showing warrants, the entire mine will be opened up this season.

Some activity has been shown in the Poplar Creek section during the past winter. At the mine of J. Mobbs, of Gerrard, considerable work was done, with good results. The Calumet and Hecla has been bonded by G. Merrill from the owner, Capt. Fitzsimmons, A. P. Garrett and others. Development work will be carried on at this property during the present season. Work is to be started on the Quinne property at Ferguson also on the Nettie L. There is a nice shoot of ore on the Nettie L., but as far as it has been developed it is found narrow. Better things are expected at depth. The men who had the True Fissure under lease have thrown it up, after taking out about 100 tons of ore. It seems that the royalty of 20 per cent and the development work were too great a handicap, and they could not make the venture pay as well as they had anticipated.

The Wild Horse Creek district is apt to be a lively place "digging" again soon, if indications go for anything. Over 15 applications for leases have recently been filed with the Geological Commissioner.

The zinc miners are feeling a little glum again now that it is known that the new tariff bill will carry a provision for duty of one cent per pound on zinc in ore entering the United States. This, coming after the decision of the Supreme Court that zinc would be admitted free, kind of shatters the hope of the owners of the mines who have zinc ore on hand for shipment, and which, as yet, cannot be handled by the Nelson zinc smelter.

There is a deal on, it is said, for the Alice mine, near Creston. The property was recently gone over by Ed. Ehrenberg and Wm. Bradley, of Spokane. The Creston mine and concentrator



tor have been shut down for some time, and when the property did cease operations it came as a mild surprise, as it was generally understood there was a large body of ore blocked out.

A bond has been taken on the Golden Bell, Sheep Creek district, by Eastern capitalists. There is good vein on the property, which, however, will require development.

The largest gold brick that has yet been sent in from the Egget was shipped last week, valued at \$7,000. The property is looking well.

It seems that President Sherman, of District 18, United Mine Workers, in declaring a strike, has once more acted in a manner not approved by officials above him and many of the men whom

he represents. It would now appear that a speedy settlement will be made of the matter by T. L. Lewis, president of the Workers, when he arrives on the scene.

**Vancouver.**—Over \$100,000 of the securities of the Portland Canal Mining Company have been underwritten in the East. With the funds derived from this issue the company is going to install an up-to-date power plant, consisting of boilers, air compressor, etc., an aerial tramway of approved type and concentrator that will give the best results for their ore. This equipment will cost in the neighborhood of \$75,000. The property comprises 12 claims on Glacier Creek, and tunnel work can be done advantageously.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Halifax.**—Hon. Mr. Chisholm has introduced several amendments to the Coal Mines Regulation Act. Every cheek weigher must send to the commissioner monthly returns of all coal weighed by him. All coal sold by retail by the owner of any mine shall be weighed at the mine and every mine owner selling by retail must furnish facilities for weighing the coal so sold. The monthly returns must contain the number of tons so sold, giving separately the number of tons supplied to workmen, or for mining operations or on the coal wharves of the owner, and the number of tons supplied to persons other than such workmen.

Another section provides that every mine examiner shall, while on discharge of his duty, use a locked safety lamp.

Borings for coal by the Canadian Consolidated Coal Co. will shortly be commenced at Lower River Inhabitants, Richmond Co. The drill to be employed is the big government drill No. 6, capable of going a depth of 3,000 feet.

Gold mining seems to be on the point of a revival in Nova Scotia. A number of mines which have been abandoned for some time are being unwatered. Among those expected to start work shortly are the Eum Secum Goldfields Co., the Ponhook Mining Co., Malaga; and the Sydney Gold Mining Co.

**Sydney.**—The Dominion Iron & Steel Co.'s plant made a record output during March in two of the most important items of production, namely, blooms and billets, and also in the matter of shipments, leaving far behind all previous figures. The total shipments were 30,000 tons.

### ONTARIO.

**Cobalt.**—The power house of the Beaver Mine was burnt down on April 4th. Arrangements have been made for power from the Temiskaming and operations are again in full blast.

The plant of the Wettlaufer mine in South Lorraine is now on the property all except the boilers. The boilers are expected to arrive at Temagami any time. The plant consists of a five-horsepower compressor two 60 h.p. boilers, a 120 light dynamo and engine, pumps, drills, etc. The shaft is being put down to the 60-foot level. The vein is about 12 inches in width of smaltite and native silver.

Diamond drilling on the Pan Silver has resulted in several veins being cut. The most promising is a calcite vein, having a width of two feet, which was cut at the 60-foot level. The drill has been shifted so as to tap this vein and prove its values at a depth of 250 feet. The main shaft is to be continued to a depth of 200 feet, when a cross-cut will be driven to No. 2 vein.

The important developments on Nipissing during the month of March included the striking of ore at the 175-foot level of No. 64, the cutting of veins No. 89 and 67 from the 60-foot level at the Kendall, and the increased showing of ore in vein No. 26 below the 110-foot level.

There are 275 men and the 27 drills at work on the La Rose. This is the largest force in camp, and nearly double the number of drills in operation upon any other property.

Considerable development is being done on the Nova Scotia. The sixth or 240-foot level is being opened, and it is intended to sink another hundred feet and make a seventh level at 340 feet. The mine at present employs 124 men. Fourteen drills are running at present, all in development work.

Work in the No. 1 shaft of Chambers-Ferland has been greatly hindered owing to the water coming in from the surface. An extra pump had to be installed to cope with the water. As a result very little drifting has been done on the large vein on the 150-foot level. The north drift has been driven 42 feet, and the south drift 38 feet.

Since the discovery of the new vein in the Cobalt Lake property, carrying native silver in quantity, drifting at a depth of 135 feet has been pushed along the vein, which averages about five inches of high-grade ore.

**Elk Lake.**—The Otisse-Currie have drifted 50 feet on their big vein at the 65-foot level, and a cross-cut has been started. They propose sinking till the 150-foot level is reached and cross-cutting again at this level.

**Gowganda.**—Two hundred town lots were offered at the April sale, and 119 were sold. The 119 lots brought a total of \$18,507.40, averaging \$152.95 per lot. The tenders ranged from \$10 to \$1,010.

**Sault Ste. Marie.**—The month of March was the best for business that the Algoma Steel Company has had since the Lake Superior Corporation commenced the manufacture of steel rails in 1902. Several conditions assisted in making the output heavy. The operation of the plant has been continuous, including the blast furnaces.

### ALBERTA.

**Lethbridge.**—Lethbridge miners, on the advice of President Frank Sherman, quit work on April 1st. All the camps in district No. 18, covering Eastern British Columbia and Alberta, are affected by the strike, with the exception of the camps of the Crow's Nest Pass Coal Company at Fernie, Michel and Carbonado, the Maple Leaf Company at Bellevue, and the Canada West at Taber.

**Medicine Hat.**—One of the municipal gas wells has been sunk to a depth of 165 feet, and a flow of 3,000,000 cubic feet per day has been developed.

**Coleman.**—A scale committee consisting of seven members of the Western Coal Operators' Association and seven members of District No. 18, United Mine Workers of America, at a conference in MacLeod extending over a large portion of March, arrived at an agreement, which agreement was to be referred to the miners, and if voted favorably upon it was arranged that both sides would meet with their attorneys to draw up the enact-



ing clause and sign the agreement for two years ending March 31st, 1911.

The referendum vote of the miners showed a majority of 209 in favor of it, and at the meeting arranged for at Macleod, March 31st, for the purpose of executing the agreement, at which the attorneys of both sides were present, F. H. Sherman, President of the Miners' Union, stated that as he had meanwhile secured what he claimed was a better agreement with the Crow's Nest Pass Coal Company, Limited, he would not sign our agreement, and if we would not sign a similar agreement to that of the Crow's Nest Pass Coal Company, Limited, it was "good-day," and thereupon left the meeting. This was followed up by his calling out the men and all of the mines comprised in the Western Coal Operators' Association are now idle. The Western Coal Operators' Association consists of the following companies:

The Alberta Railway & Irrigation Company, Limited.  
The Royal Collieries, Limited.  
The Leitch Collieries, Limited. ?  
The West Canadian Collieries, Limited.  
The International Coal & Coke Company, Limited.  
The Hosmer Mines, Limited.  
The H. W. McNeill Company, Limited.  
The Bankhead Mines, Limited.  
The Hillcrest Coal & Coke Company, Limited.

which are by far the largest majority of the operators of the district, and mining in round figures over 1,500,000 out of the 2,500,000 tons mined last year. As several of the mines in the Association are new mines that have not yet begun shipments or are only beginning to, it will be seen that the Western Coal Operators' Association not only are the largest as to numbers but as to tonnage and prospective tonnage.

Attempts have been made to re-open negotiations, but the operators remain firm in their position that the agreement arrived at in Macleod and ratified by a majority of the men in a referendum vote must be signed and put into effect.

Insert in B C Ore Shipments ... 5.... ..u MOi( SHRDLU

The following are the ore shipments for the week ending April 9th, and year to date:

#### BRITISH COLUMBIA.

**Nelson.**—The Silver King has been unwatered as far as the seventh level, and 40 men are being employed. The Silver King has been worked to a depth of 1,000 feet, but it is not intended to pump out the water below the seventh level at present.

**Grand Forks.**—No. 2 furnace of the Granby smelter has been blown in. This is the second furnace which has been enlarged 25 per cent. from its former capacity. The settlement for another year of the differences between the Crow's Nest Pass Coal Company and the miners assures the Granby Company a sufficient supply of coke and coal. The smelter treatment for the present year should show a large increase over that of last year.

**Phoenix.**—The first shipment of machinery has arrived at Eholt for the new mill now under construction at the Jewel mine. The mill is being erected by a syndicate to test a slimes-treating process of separating gold from tailings. It is the invention of H. Nichols, of the Ymir mine. It is expected that the mill will be in operation by the end of May.

**Greenwood.**—The strike in the coal mines of Eastern British Columbia may seriously affect the B. C. Copper Company, which obtains its coke from Hosmer, one of the points where the miners have quit work. The company have only enough reserve coke to last ten or twelve days.

The by-law granting a bonus of \$50,000 to the Greenwood-Phoenix Underground Tramway was carried on April 7th by 114 majority. The largest vote ever polled was cast. The company carried out its promises to the electors by starting work at 8 a.m. the next morning.

**Vancouver.**—A vein of copper ore 26 feet in width has been struck in the Ikeda mine, near Jedway, on Moresby Island, Queen Charlotte Islands. On March 22nd, at a distance in the tunnel of 850 feet, and at a depth of 350 feet, a 15-foot vein was encountered. Development on the vein showed it to be still larger, and it has now reached a width of 26 feet.

A strike of magnetite ore near the mouth of Campbell River, Vancouver Island, has been made. Tests of the ore have been made by Prof. Hoffman, of Ottawa, and Mr. J. O'Sullivan, of Vancouver. The former gauged it as running 67.47 per cent. magnetite, and the latter as running 68.14. The deposit is said to be large.

#### YUKON.

**Dawson.**—Three new discoveries of importance have been made in the Klondike this winter as the result of persistent prospecting. Early in the winter a strike was made on Barker Creek; then came the discovery on the lower end of Glacier, and lately a strike has been made on Hubbard Creek. Bedrock on this last is 45 feet deep, with 4 feet of pay that is said to run from 8 to 10 cents.

## MINING NEWS OF THE WORLD.

#### GREAT BRITAIN.

The Fife Coal Company have decided to make an experiment in the provision of bathing accommodation for their workmen. A building is to be erected at the pit head and fitted with spray baths, accommodations for undressing and changing garments, and storing working clothes.

There were 14 English mining companies organized in 1908 for the purpose of exploiting the mineral wealth of Russia. The combined capital of these companies is \$18,660,000.

The Northumberland Coal Trade Conciliation Board has decided to reduce the wages of workmen by 8¼ per cent. This is the heaviest reduction since October, 1901.

#### BELGIUM.

The Belgian Chamber of Mines has, after much discussion, passed a bill limiting the number of hours of work in mines to nine hours.

#### GERMANY.

The scheme for the formation of a German steel bar syndicate has again miscarried. It had been proposed to syndicate the export trade and pay a bounty of 15s. per ton, which would be provided by a levy of so much per ton on the inland and export sales and on the individual consumption of producers.

#### UNITED STATES.

A Western Lead Ore Producers' Association has recently been formed at a conference in Salt Lake City. The association intends to bring all guns to bear to have a protective tariff against British Columbia and Mexican lead ores.

The first steps in the upbuilding of the industry that is to rival the smelter trust has been taken. A contract has been let for the excavation work, and an order for 7,000 tons of structural steel placed. The first smelter is to be erected in Tooele



ounty, Utah, and is to have an initial capacity of from 2,000 to 2,500 tons daily.

### MEXICO.

A movement is on foot for the organization of an institute of mining engineers and metallurgists for Mexico. The new society will be known as the "Institute Mexicano de Minas y Metallurgia."

A plant to demonstrate the application of the Delprat & better zinc-flotation process will be erected in Mexico City by an English company, of which H. Lawrence Read, of Australia, is the managing director.

The problem of silicious ores for the Mexican smelters is coming of much moment. The erection of cyanide mills to treat the silicious silver ores of the big camps has changed the surplus of ores of this character into a shortage, and the condition will become more acute in the future.

### PERU.

A new smelter erected by the Cerro del Pasco Company will be in commission by April 15th, and the company's monthly output of blister copper will be increased from 2,500,000 pounds to 4,000,000 pounds.

### SOUTH AFRICA.

The Johannesburg Chamber of Mines places the March production of gold from the Rand at 608,000 ounces. It compares with 565,000 ounces the output of February, and 615,000 ounces in the opening month of the year.

Twenty stamps to be installed at the West Rand Consolidated company will be the heaviest on the Witwatersrand. Each stamp will weigh 1,850 pounds, and have a duty of 12 tons per 4 hours.

### AUSTRALASIA.

The Broken Hill Proprietary Company have completed their first zinc distillation furnace, and nine more are to be erected. Suitable clay for making the retorts has been discovered in the vicinity. It is expected that eight furnaces will be in operation by the end of 1909.

In the Broken Hill labor dispute, Justice Higgins, the arbitrator, has fixed the rate of wages for unskilled labor at 8s. 7½d. and 8s. 3d. a day, respectively. Miners are to receive 10s. a day. The hours of labor are fixed at 48 a week. The arbitrator declined to interfere with the contract system, or to compel the Proprietary Company to continue work. Justice Hig-

gins' award provides for wages on the same scale as heretofore. The Proprietary Company has appealed from this decision.

The coal mines of New Zealand are again working after the recent strike. As has nearly always been the case in New Zealand, the miners came off second best.

## COMPANY NOTES.

### DOMINION STEEL DIVIDEND.

A dividend of 10½ per cent. on account of 42 per cent. of deferred payments on the preferred stock has been declared by the Dominion Iron and Steel Company, payable May 10th. The remaining arrears of dividend are to be paid in full in the course of a year. Regular dividends are to be resumed October 1st, 1909.

### EARNINGS OF LA ROSE.

Net earnings of the La Rose Consolidated for February and March averaged about \$75,000 per month. In January the earnings were \$90,000.

The present earnings of the La Rose Company are derived from new developments, without encroaching upon reserves, which are in the neighborhood of \$2,500,000.

### KERR LAKE DIVIDEND AND BONUS.

The Kerr Lake Mining Company have declared the regular dividend of 4 per cent., and an extra dividend of 2 per cent., payable June 15th, to stock of record June 1st.

### NIPISSING'S MARCH EARNINGS.

During March, Nipissing mined ore of estimated value of \$141,623, and shipped ore of estimated value of \$193,845. Important developments of the month included the striking of ore at the 175-foot level of 64, cutting veins 89 and 67 from the 60-foot level at Kendall, and increased showing of ore in vein No. 26, below the 110-foot level.

### CONIAGAS QUARTERLY DIVIDEND.

The Coniagas Mining Company has declared the regular quarterly dividend of 3 per cent., payable May 1st.

### DIVIDEND ON TRETHEWAY.

At the meeting of the Trethewey directors an interim dividend of 10 per cent. was declared, payable on May 15th to shareholders of record on May 1st. The finances of the company are said to be in excellent shape, and a statement will shortly be made to shareholders.

## STATISTICS AND RETURNS.

The shipments for the month of March as reported by the C. & N. O. Railway Commission were:—

|                            | Cars. | Pounds.   | Tons.  |
|----------------------------|-------|-----------|--------|
| Nipissing . . . . .        | 21    | 1,386,220 | 693.11 |
| La Rose . . . . .          | 14    | 932,800   | 466.40 |
| Crown Reserve . . . . .    | 8     | 452,800   | 226.40 |
| Chambers-Ferland . . . . . | 5     | 297,440   | 148.72 |
| O'Brien . . . . .          | 4     | 269,510   | 134.76 |
| Trethewey . . . . .        | 4     | 247,620   | 123.81 |
| P. & H. B. . . . .         | 4     | 226,600   | 113.30 |
| Coniagas . . . . .         | 3     | 189,300   | 94.65  |
| City of Cobalt . . . . .   | 3     | 188,492   | 94.24  |
| Kerr Lake . . . . .        | 3     | 177,985   | 89.00  |
| Right of Way . . . . .     | 3     | 181,800   | 90.90  |
| Buffalo . . . . .          | 3     | 146,080   | 73.04  |
| McKinley-Darragh . . . . . | 2     | 111,960   | 55.89  |

|                          |    |           |          |
|--------------------------|----|-----------|----------|
| Temiskaming . . . . .    | 2  | 100,000   | 50.00    |
| Peterson Lake . . . . .  | 1  | 51,400    | 25.70    |
| Nova Scotia . . . . .    | 1  | 79,420    | 39.71    |
| King Edward . . . . .    | 1  | 44,130    | 22.06    |
| Cobalt Central . . . . . | 1  | 40,000    | 20.00    |
| Totals . . . . .         | 83 | 5,123,557 | 2,561.78 |

The shipments from the camp for the first three months of 1909 were:—

|                    | Cars. | Pounds.    | Tons.    |
|--------------------|-------|------------|----------|
| January . . . . .  | 74    | 4,750,258  | 2,375.13 |
| February . . . . . | 71    | 4,207,734  | 2,103.85 |
| March . . . . .    | 83    | 5,123,557  | 2,561.78 |
| Totals . . . . .   | 228   | 14,081,549 | 7,040.76 |

## COBALT ORE SHIPMENTS.

Following are the weekly shipments from the Cobalt camp and those from January 1, 1909, to date:—

|                      | Week ending<br>April 10. | Since<br>Jan. 1. |
|----------------------|--------------------------|------------------|
| Ore in lbs.          | Ore in lbs.              |                  |
| Crown Reserve .....  | 118,340                  | 1,539,796        |
| Cobalt Central ..... | 43,490                   | 205,245          |
| City of Cobalt ..... | 109,000                  | 688,522          |
| Kerr Lake .....      | 40,360                   | 423,442          |
| La Rose .....        | 324,540                  | 3,709,750        |
| Nipissing .....      | 128,880                  | 3,380,060        |
| O'Brien .....        | 64,170                   | 461,320          |
| Right of Way .....   | 283,000                  | 926,890          |
| Silver Queen .....   | 62,865                   | 127,865          |
| Temiskaming .....    | 120,000                  | 590,000          |

Ore shipments to April 10, 1909, are 15,664,342 pounds, or 7,832 tons. Total ore shipments for week ending April 10, 1,294,653 pounds, or 647 tons.

|                            | Week ending<br>April 17. | Since<br>Jan. 1. |
|----------------------------|--------------------------|------------------|
| Ore in lbs.                | Ore in lbs.              |                  |
| Buffalo .....              | 60,930                   | 340,020          |
| Coniagas .....             | 63,615                   | 524,820          |
| Crown Reserve .....        | 119,480                  | 1,659,276        |
| Cobalt Central .....       |                          | 205,245          |
| Chambers-Ferland .....     | 60,000                   | 489,522          |
| City of Cobalt .....       |                          | 688,522          |
| Kerr Lake .....            |                          | 423,442          |
| King Edward .....          |                          | 98,050           |
| La Rose .....              | 485,468                  | 4,195,218        |
| McKinley-Darragh .....     | 66,900                   | 486,940          |
| Nipissing .....            | 130,240                  | 3,510,300        |
| Nova Scotia .....          |                          | 480,810          |
| Nancy Helen .....          |                          | 40,000           |
| Peterson Lake .....        |                          | 132,960          |
| O'Brien .....              |                          | 461,320          |
| Right of Way .....         | 150,680                  | 1,077,570        |
| Silver Queen .....         |                          | 127,865          |
| Temiskaming .....          | 60,200                   | 650,200          |
| Trethewey .....            |                          | 653,550          |
| T. & H. B. ....            |                          | 610,600          |
| Muggley Concentrator ..... |                          | 72,900           |

Ore shipments to April 17, 1909, are 16,861,855 pounds, or 8,430 tons. Total shipments for week ending April 17, 1,197,513 pounds or 598 tons.

## BRITISH COLUMBIA ORE SHIPMENTS.

The following are the ore shipments for the week ending April 2nd and year to date:—

| Boundary Shipments. |                |
|---------------------|----------------|
| Total .....         | 30,516 384,949 |

| Rossland Shipments. |              |
|---------------------|--------------|
| Total .....         | 5,226 57,724 |

| Slocan-Kootenay Shipments. |              |
|----------------------------|--------------|
| Total .....                | 3,571 45,117 |

The total ore shipments for the past week were 39,313 tons, and for the year to date 487,790 tons.

| Granby Smelter Receipts.<br>Grand Forks, B.C. |                |
|-----------------------------------------------|----------------|
| Total .....                                   | 19,969 250,589 |

| B. C. Copper Co.'s Receipts.<br>Greenwood, B.C. |               |
|-------------------------------------------------|---------------|
| Total .....                                     | 8,778 106,857 |

## Consolidated Co.'s Receipts.

Trail, B.C.

|             |              |
|-------------|--------------|
| Total ..... | 7,628 85,388 |
|-------------|--------------|

## Le Roi Smelter Receipts.

Northport, Wash.

|             |            |
|-------------|------------|
| Total ..... | 140 12,761 |
|-------------|------------|

The total smelter receipts for the past week were 36,511 tons, and for the year to date 455,595 tons.

The following are the ore shipments for the week ending April 9th and year to date:—

## Boundary Shipments.

|             |                |
|-------------|----------------|
| Total ..... | 28,268 413,217 |
|-------------|----------------|

## Rossland Shipments.

|             |              |
|-------------|--------------|
| Total ..... | 4,240 66,964 |
|-------------|--------------|

## Slocan-Kootenay Shipments.

|             |              |
|-------------|--------------|
| Total ..... | 3,877 48,994 |
|-------------|--------------|

The total shipments for the past week were 36,385 tons and for the year to date 529,175 tons.

## Granby Smelter Receipts.

Grand Forks, B.C.

|             |                |
|-------------|----------------|
| Total ..... | 17,395 267,984 |
|-------------|----------------|

## B. C. Copper Co.'s Receipts.

Greenwood, B.C.

|             |               |
|-------------|---------------|
| Total ..... | 8,442 116,299 |
|-------------|---------------|

## Consolidated Company's Receipts.

Trail, B.C.

|             |              |
|-------------|--------------|
| Total ..... | 8,693 94,081 |
|-------------|--------------|

The total smelter receipts for the past week were 34,530 tons and the year to date 490,125 tons.

## MARKET REPORTS.

## Silver Prices.

|               |         | New York.<br>cents. | London.<br>pence. |
|---------------|---------|---------------------|-------------------|
| April 3 ..... | 50 7/8  |                     | 23 7-16           |
| " 5 .....     | 51      |                     | 23 1/2            |
| " 6 .....     | 50 3/4  |                     | 23 3/8            |
| " 7 .....     | 50 7/8  |                     | 23 7-16           |
| " 8 .....     | 50 7/8  |                     | 23 7-16           |
| " 9 .....     | Holiday |                     | Holiday           |
| " 10 .....    | Holiday |                     | Holiday           |
| " 12 .....    | 50 7/8  |                     | 23 7-16           |
| " 13 .....    | 51 1/8  |                     | 23 9-16           |
| " 14 .....    | 51 1/8  |                     | 23 9-16           |
| " 15 .....    | 51 1/8  |                     | 23 9-16           |
| " 16 .....    | 50 7/8  |                     | 23 7-16           |
| " 17 .....    | 51 3/8  |                     | 23 5/8            |

April 16.—Connellsville coke, f.o.b., ovens:—

Furnace coke, prompt, \$1.40 to \$1.50.

Foundry coke, prompt, \$1.80 to \$2.00.

## Metals.

April 16.—Tin, Straits, 29.45 cents.

Copper, prime Lake, 13 cents.

Electrolytic copper, 12.70 cents.

Copper wire, 14.25 cents.

Lead, 4.15 to 4.20 cents.

Spelter, 5.10 cents.

Sheet zinc, 7.25 cents.

Antimony, Cookson's, 8.25 cents.

Aluminium, 22 to 24 cents.

Nickel, 40 to 47 cents.

Platinum, \$22.50 to \$23.50 per ounce.

Bismuth, \$1.75 per lb.

Quicksilver, \$45.00 to \$46.00 per 75 lb. flask.



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# PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

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|-----------------------------------------------------|-------------------------------------------------|---------------------------------|
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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| <p>1017. Summary Report, Department of Mines, Geological Survey, for 1907.</p> <p>982. Report on a Portion of Conrad and Whitehorse Mining District, Yukon, by D. D. Cairns.</p> <p>996. Preliminary Report on a Portion of the Main Coast of British Columbia and Adjacent Islands, including New Westminster and Nanaimo District, by O. E. Leroy.</p> <p>988. Report on Telkwa and Vicinity, British Columbia, by W. W. Leach.</p> <p>886. Preliminary Report on a Portion of the Similkameen District, British Columbia, by Charles Camsell.</p> <p>968. Report on Moose Mountain District of Southern Alberta, by D. D. Cairns.</p> <p>992. Report on a Portion of Northwestern Ontario traversed by the National Transcontinental Railway between Lake Nipigon and Sturgeon Lake, Ontario, by W. H. Collins.</p> | <p>962. Second Edition of a Report on the Geology and Natural Resources of the Area included in the Nipissing and Timiskaming Map Sheets, by A. E. Barlow.</p> <p>961. Reprint of a Report on the Origin, Geological Relations and Composition of the Nickel and Copper Deposits of the Sudbury Mining District, by A. E. Barlow.</p> <p>1028. Report on a Recent Discovery of Gold near Lake Megantic, Quebec, by J. A. Dresser.</p> <p>983. The Geology and Mineral Resources of New Brunswick, by R. W. Ellis.</p> <p>1021. Explorations in Nova Scotia, Summary Report by Hugh Fletcher.</p> <p>Map No. 71, St. Margaret Bay Sheet, by E. R. Faribault.</p> <p>Map No. 70, Aspotogan Sheet, by E. R. Faribault.</p> <p>Map No. 68, City of Halifax Sheet, by E. R. Faribault.</p> |
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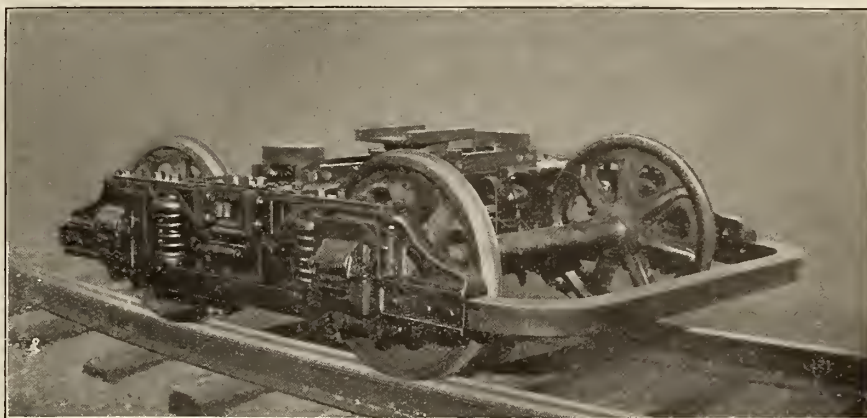
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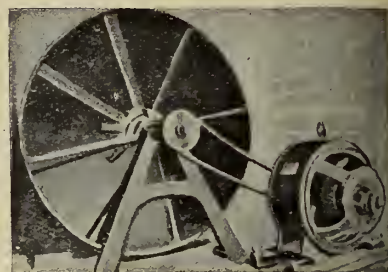
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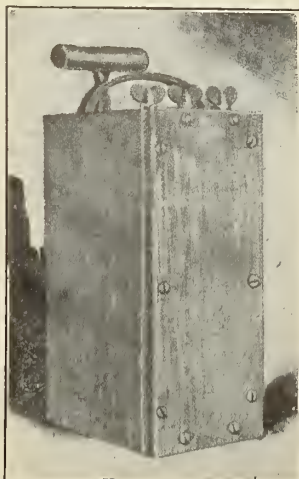
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Nearly 700 Machines at work. 93 in use by one Canadian Company.

## The Hardy Simplex Hammer Drill

Weight 22 lbs. Bores 6 ft. Deep.

Automatically Rotates the Drill Steel and lows out the Cuttings  
FOR SINKING, &c.

### SOLE MAKERS

The Hardy Patent Pick Co., Limited  
SHEFFIELD, ENGLAND

Stocks of these machines kept by Messrs. A. C. Thompson  
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## WHY NOT TRY A "CLEVELAND" STOPE DRILL

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We will gladly ship you a complete equipment for trial, and guarantee that it will do more work than any similar machine on the market at less cost for maintenance.

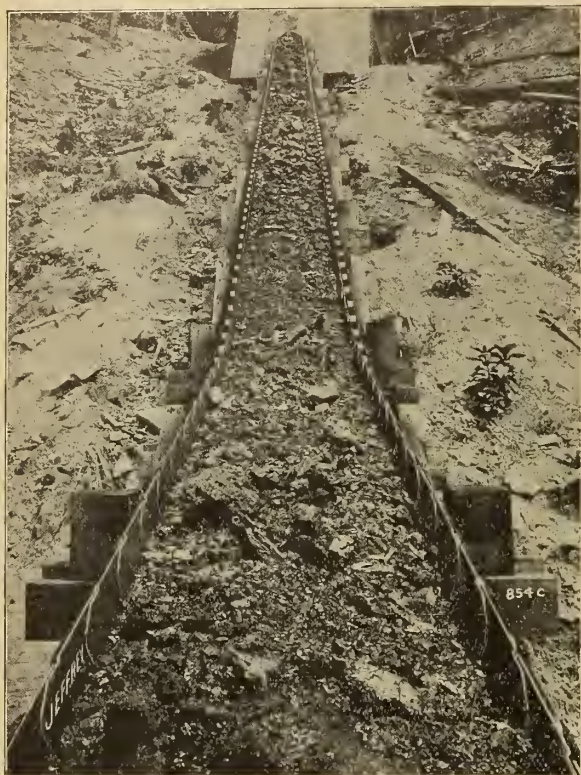
Our aim has been to make an efficient, "fool proof" simple and durable machine, and we ask that you give us a chance to prove that we have succeeded.

Try One with your other Drills and see the difference.

BULLETIN 40

**The Canadian Cleveland Drill Co.**  
COBALT, ONT. Limited.





## Jeffrey Retarding Conveyers

are the best means of delivering coal from upper to lower tipple without breakage. We have Conveyers of this type in operation handling from 50 to 500 tons, distances as great as 1150 ft.

Descriptive Catalogue X67

WE BUILD

### Complete Coal Mine and Tipple Equipments

including

Electric Locomotives, Coal Cutters, Drills, Car Hauls, Coal Washeries, Screens, Crushers, Fans, Cages, Pumps, Hoists, Elevators, etc.

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**THE JEFFREY MFG. COMPANY**  
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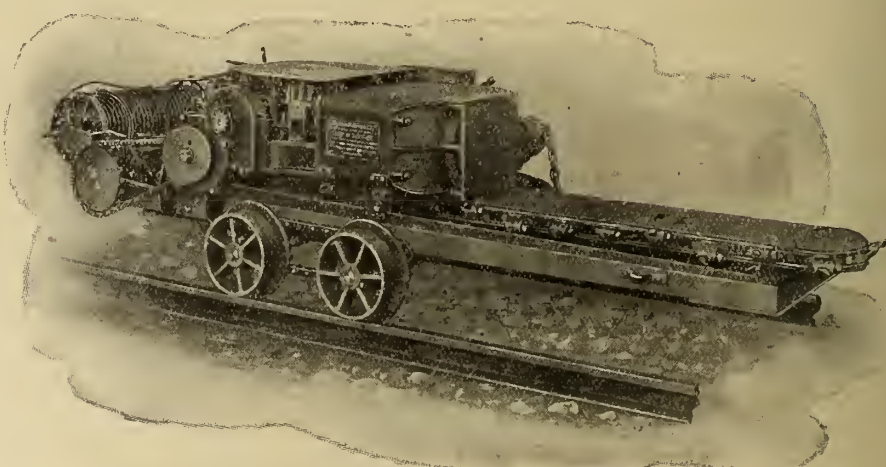
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of the chain cutter bar type, are furnished to suit any mining conditions. These machines are supplied for either air or electric drive, for room and pillar "panel" system, or long wall mines and for any height of coal or depth of undercut.

Experience in the mining fields of this country has shown Sullivan Chain Coal Cutters to be the most efficient mining machines of this type on all work from entry driving to "Long wall".

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Rock Drills, Coal Pick Machines, Air Compressors, Diamond Drills

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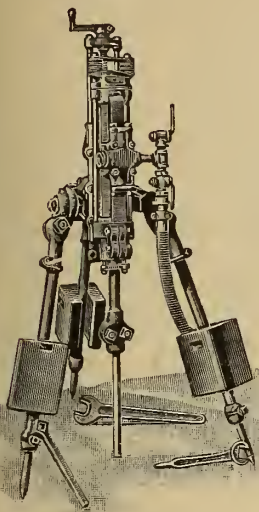
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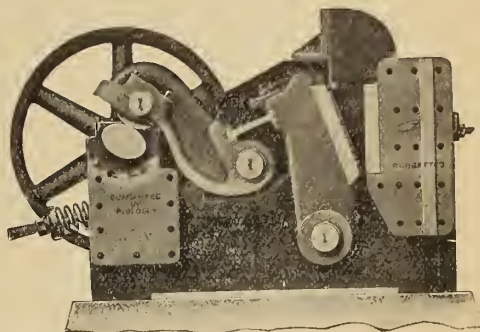
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Crushing, Grinding,  
Pulverizing and  
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☐ Built in sizes ranging from 2" to 5½" Cylinder diameter, for all work from boulder breaking to submarine drilling.

☐ Our claim that the Rand drill is the best in the market is proven by the sale of more of this type than of all other makes combined.

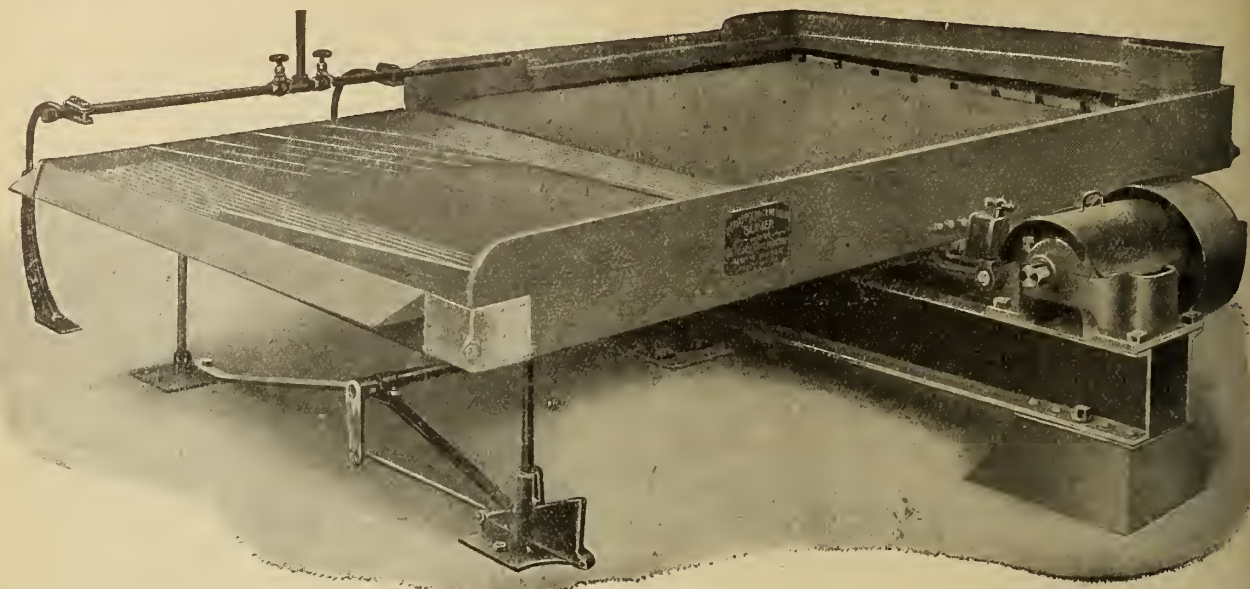
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## CANADIAN RAND CO., LIMITED

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The greatest advance in slime concentration attained in recent years has been accomplished by this table. Its success is emphasized by the fact that as the result of an elaborate competitive test with vanners of various makes **70 of these Tables are now in operation in the new mill of the Goldfield Consolidated Mines Co., Goldfield, Nevada**

This should draw the attention of all mill men. Send for Nos. 1, 2, and 3 Catalogues.

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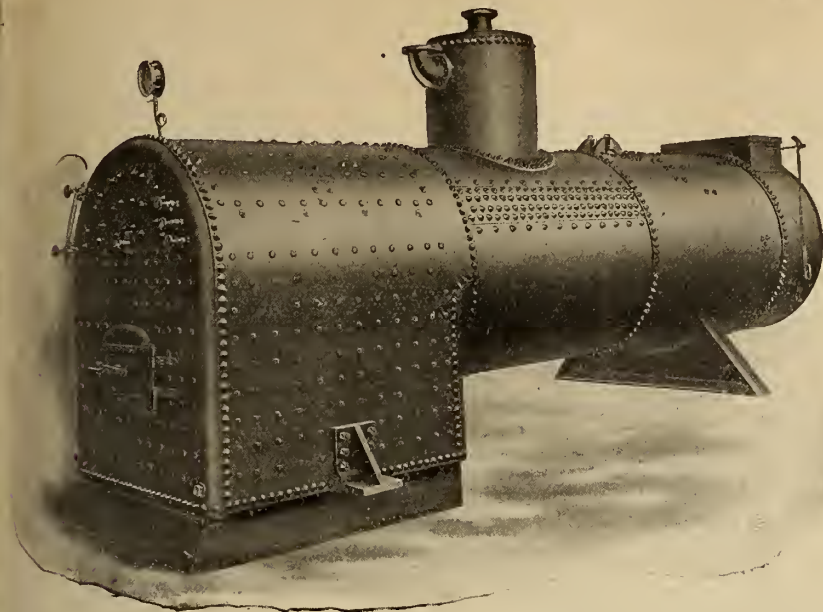
Chemical and Physical tests  
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Write for prices for  
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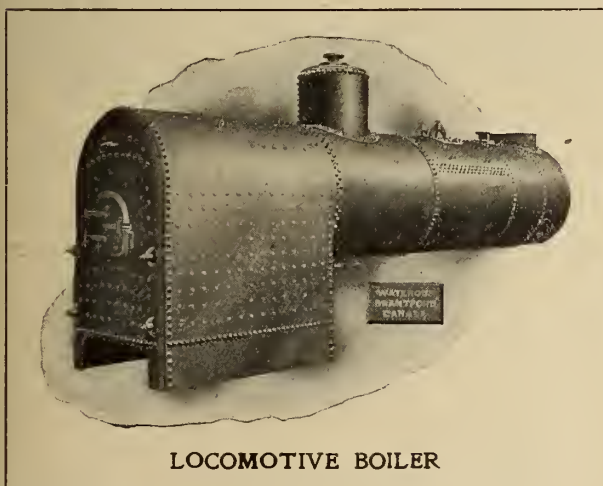
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72" x 18' - 66" x 16' - 60" x 14' - 48" x 14'

**1 HOISTING ENGINE**, double cylinder, double drum, only used two weeks, thoroughly overhauled, cheap.

**SHEET IRON and TANK WORK, AIR RECEIVERS, HEATERS, ENGINES, ROCK CRUSHERS, Etc.**

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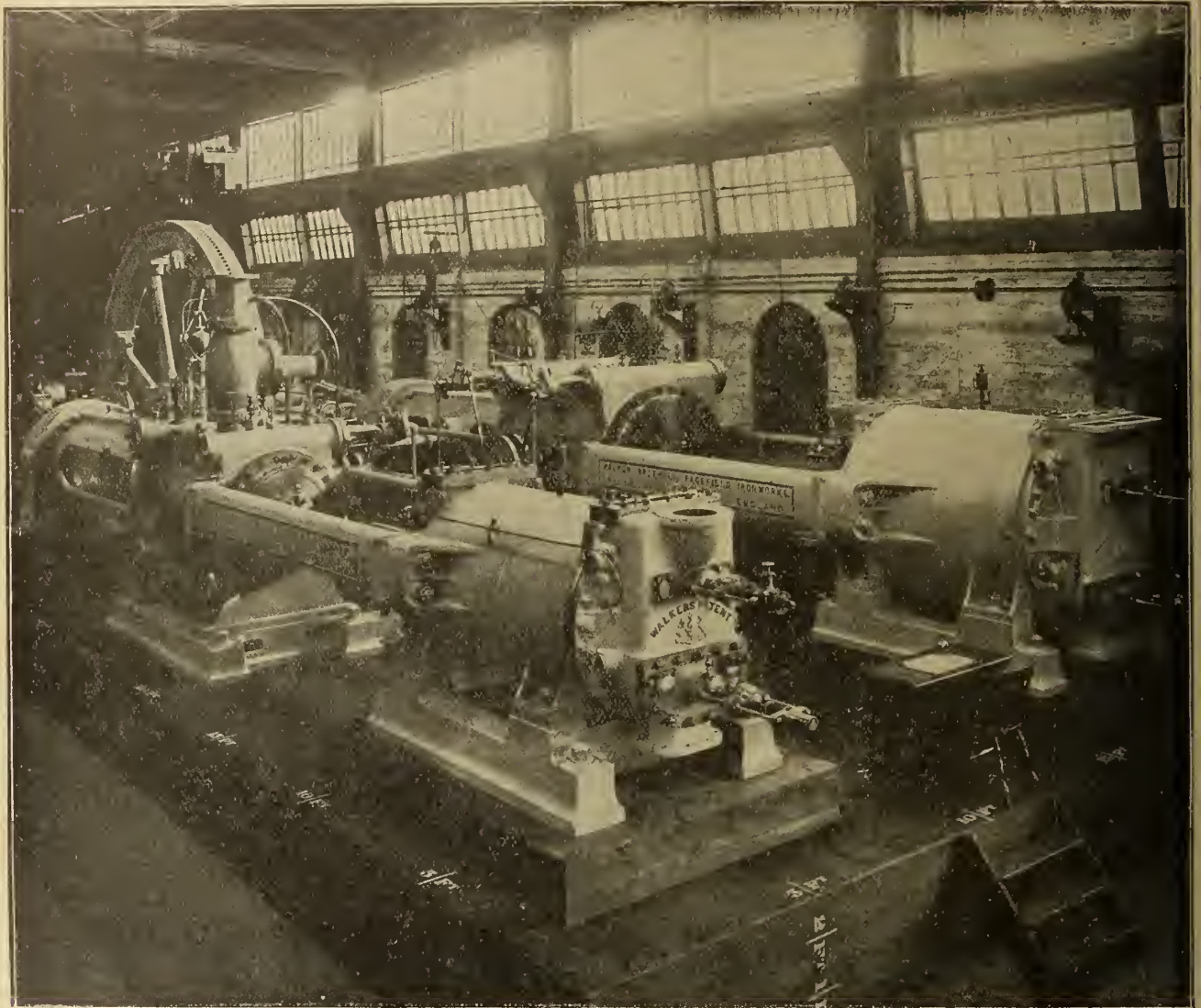
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## Wigan, England



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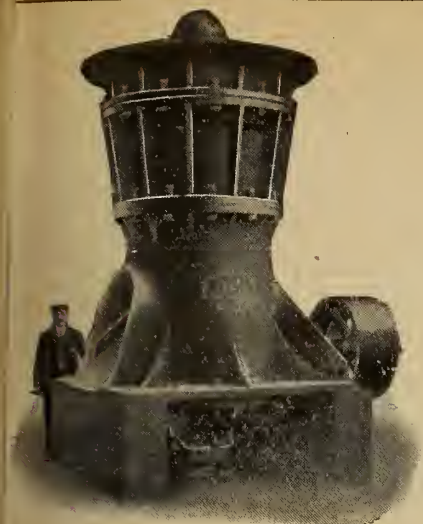
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CANADA LIFE BUILDING,  
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is used for all the wearing parts. This steel is the supreme material for  
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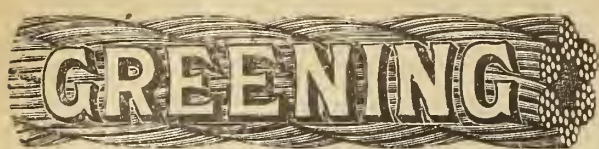
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The book department of the Canadian Mining Journal has a limited number of complete bound volumes of the Canadian Mining Journal (including index) for the years 1907 and 1908 for sale. Anyone wishing one or both of these volumes should apply at once to secure his order. The price is \$5.50 per volume or the two volumes for \$10.00.

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**Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.**

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CORRESPONDENCE SOLICITED.

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**Engines, Air Compressors**

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We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., \$400 to \$10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

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MINING COMPANY AUDITS A SPECIALTY

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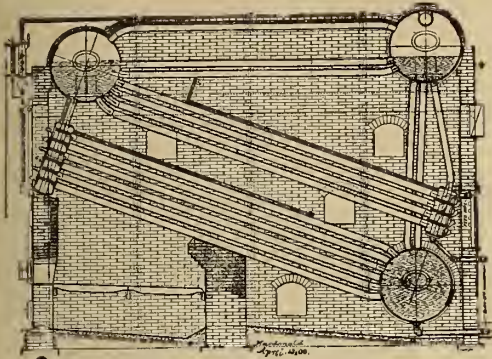
Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

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Free expansion of tubes. Perfect water circulation. Dry or superheated steam. Half the usual number of handholes.

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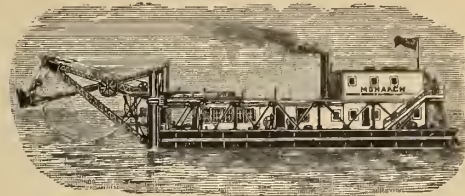
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Limited

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Mine Hoists, Hoisting Engines,  
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**TURNABLES, ROOF TRUSSES  
STEEL BUILDINGS  
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Structural METAL WORK of all kinds**

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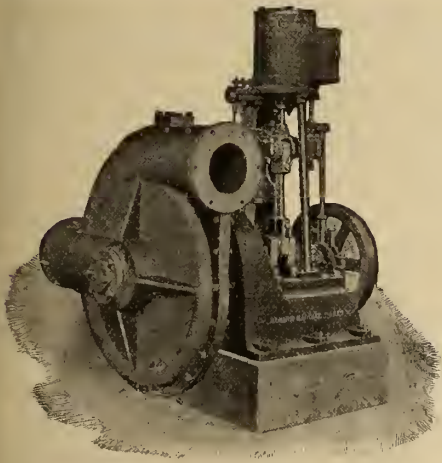
**Centrifugal Pumping Machinery for various Industrial Purposes**

We are building a special solid steel lined pump for handling tailings or slimes in gold mining. Estimates furnished upon application for pumping outfits for special purposes. Write for catalogue.

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## STEAM AND ELECTRIC

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The **FLORY CABLEWAY SYSTEM** is Superior to any on the Market

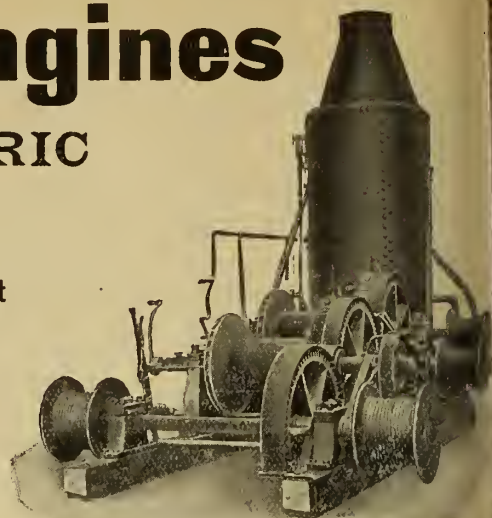
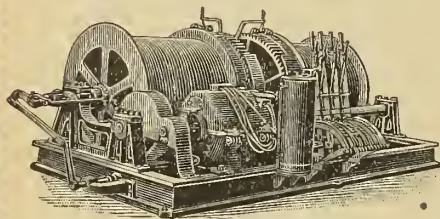
**Slate Mining and Working Machinery**

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MAY PROVE THE SOLUTION.

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All types and sizes. Complete outfits. Write for catalogue

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Experienced Travellers  
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for its excellent equipment. All are pleased with the bright, modern coaches; the exceptionally roomy berths in the sleeping cars; superior dining car service, etc.

The "good cars" bring the C. P.R. hundreds of passengers every week.

All equipment is built in the Angus Shops at Montreal from the most modern designs, embodying every improvement known to practical railroading.

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The Canadian Behrend Dry Concentration Co., Limited has changed its name to "BEHREND CONCENTRATORS, LIMITED."

The system embraces both dry and wet features and we are prepared to treat all ores.

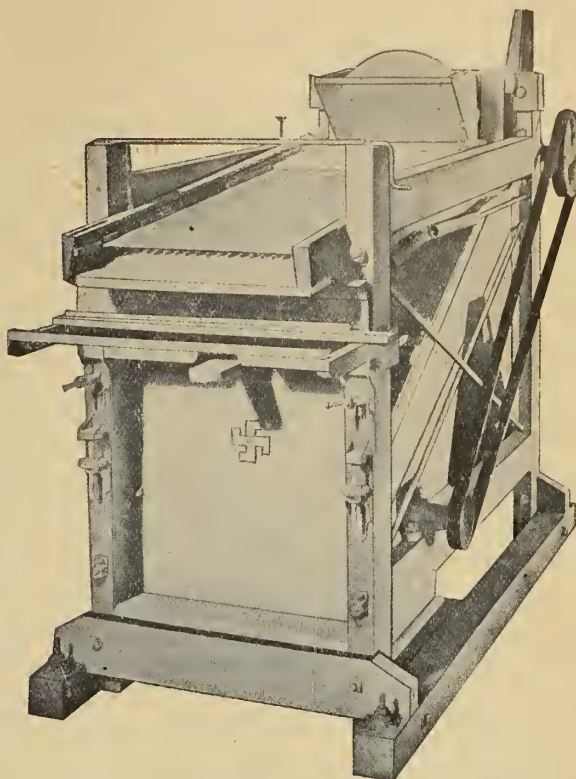
On Graphite, Molybdenite, Chalcopryrite and other difficult ores tailings and slimes practically ALL the values can be recovered.

A completely equipped plant, including concentrators, crushers, rolls, etc. for testing purposes is located at address below.

Write us for descriptive pamphlet. Forward sample of your ore for preliminary test.

**BEHREND CONCENTRATORS, LIMITED**

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300 Underwoods are made every working day. It is the largest output of any typewriter factory in the world.

The public would not take that output, and more if they could get it, if any other typewriter would give them as good service. The Underwood is not the cheapest in price but it is the cheapest in service. If you pay less you get less—a great deal less. The typewriter is cheap that gives you the best service, no matter what it costs. In this sense the Underwood is cheap.

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**JACQUES BASZANGER & CO.,**

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Importers of

## Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found.  $\frac{1}{4}$  actual size.

NOTE. We personally break (in this country) our carbons, thereby enabling us to determine accurately their quality. We deal only in very best quality and are always ready to ship goods on approval and for selection to responsible parties. Write us.

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*Printing a Specialty.*

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Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.

**To Date 34 Lives Saved by Its Use**



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The latest model. Helmet fitted with Electric Head Light.

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### Wrought Iron and Steel Pipes

All Sizes and to any Pressure

**Iron and Steel Boiler Tubes**

**Red, White and Blue Brand Mining Steel**

Full stock always on hand.

### Cold Drawn Seamless Steel Boiler Tubing

"KERRA" BRAND

For Stationary, Marine and Locomotive Boilers

**Pressed Steel Floor Plates**

Raised Diamond and Ribbed Pattern

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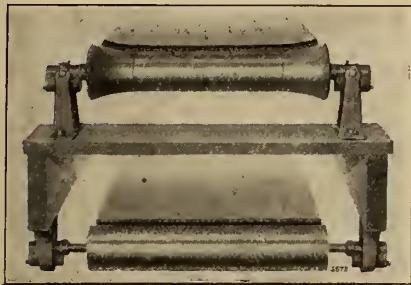
Tarred, Airproof, also Fireproof. Quality Guaranteed. All Sizes for Direct Import.  
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**LARGE STOCKS CARRIED IN MONTREAL FOR IMMEDIATE SHIPMENT**

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# Belt Conveyors



The "Link-Belt" Patented Pressed Steel Roll for shallow troughing of belt conveyors: closed ends prevent entrance of material to interfere with rotation. Through-shaft revolves in dust-tight bearings. Write to

## Link-Belt Company

PHILADELPHIA CHICAGO INDIANAPOLIS

NEW YORK, 299 Broadway. PITTSBURGH, 1501-02 Park Building.  
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## WE CARRY A FULL LINE OF THESE GOODS

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WHOLESALE DRUGGISTS

Dealers in Chemical & Assay Apparatus

ST. PAUL STREET, - - MONTREAL

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## NEW BOOK.

# PRINCIPLES OF MINING

VALUATION — ORGANIZATION — ADMINISTRATION

Copper, Gold, Lead, Silver, Tin and Zinc

By Herbert C. Hooper, E. M. 200 pages, 6x9, illustrated, \$2.50 (10/6) net postpaid Published April 1909

Under the general headings of Valuation, Organization and Administration, Mr. Hooper gives here the Principles of Mining as developed by modern science and business methods. He adds important chapters on investment from the public's standpoint and the character, training and obligations of the mining engineer. The book is important and valuable. Mr. Hooper's very wide and varied experience and his active association with a great number of mining ventures in various parts of the world, enable him to command an unusual amount of valuable data.

At the same time, besides drawing freely from his own material and experience, he has had at his disposal the results of the work of many associates.

## CONTENTS

### Valuation of Copper, Gold, Lead, Silver, Tin and Zinc Lode Mines

Determination of average metal content; sampling; assay plans; calculation of averages; percentage of errors in estimate from sampling.

#### Mine Valuation

Calculation of quantities of ore, and classification of ore in sight.

Prospective value; extension in lepth; origin and structural character of the deposit; secondary enrichment; size of deposits; development in neighboring mines; depth of exhaustion.

Recoverable percentage of the gross assay value; price of metals; cost of production.

Redemption or amortization of capital and interest.

Valuation of mines with little or no ore in sight; valuation on second-hand data; general conduct of examination; reports.

#### Development of Mines

Entry to mine; tunnels; vertical, inclined and combined shafts; location and number of shafts.

Shape and size of shafts; speed of sinking; tunnels.

Subsidiary development; stations; cross-cuts; levels; interval between levels; protection of levels; winzes and rises. Development in prospecting stage; drilling.

#### Stoping

Method of ore breaking; underhand stopes; overhand stopes; combined stope. Valuing ore in course of breaking.

#### Methods of Supporting Excavation

Timbering; filling with waste; filling with broken ore, pillars of ore; artificial pillars; caving system.

#### Mechanical Equipment

Conditions bearing on mine equipment; winding appliances; haulage equipment in shafts; lateral underground transport; transport in stopes.

Drainage; controlling factors; volume and head of water; flexibility; reliability; power conditions; mechanical efficiency; capital outlay. Systems of drainage; steam pumps; compressed-air pumps; electrical pumps; rod-driven pumps; bailing; comparative value of various systems.

Machine drilling; power transmission; compressed air vs. electricity; air drills; machine vs. hand drilling. Workshops. Improvement in equipment.

### Ratio of Output to the Mine

Determination of possible maximum; limiting factors; cost of equipment; life of the mine; mechanical efficiency of patchwork plant; overproduction of base metal; security of investment.

#### Administration

Labor efficiency; skill; intelligence; application co-ordination; contract work; labor unions; real basis of wages.

Accounts and technical data and reports; working costs; division of expenditure; inherent limitations in accuracy of working costs; working cost sheets. General technical data; labor; supplies; power; surveys; sampling and assaying. Administrative reports.

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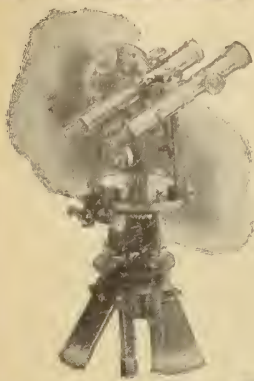
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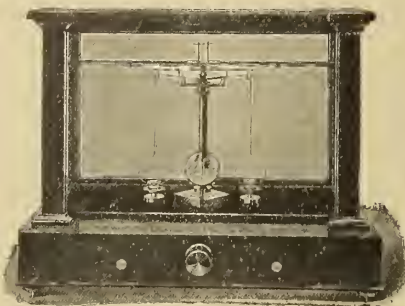
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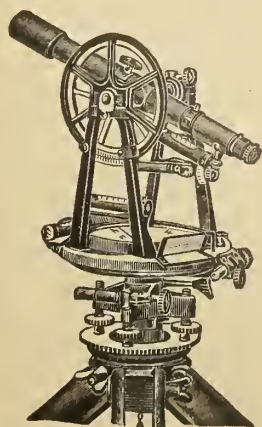
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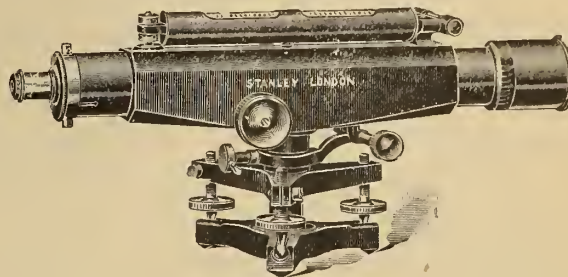
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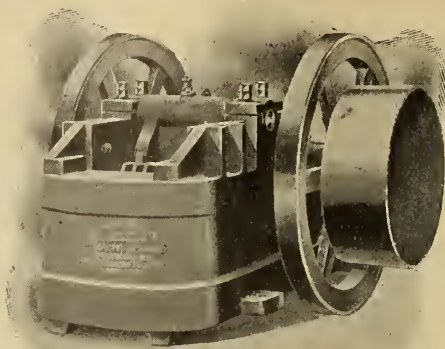
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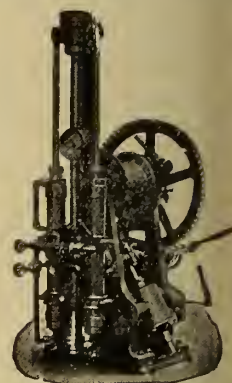
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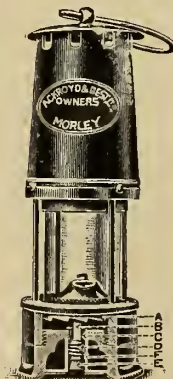
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# THE CANADIAN MINING JOURNAL

OL. XXX.

TORONTO, May 15, 1909

No. 10

## The Canadian Mining Journal

With which is incorporated the

"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

**MINES PUBLISHING CO., LIMITED**

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Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

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## SUMMARY REPORT OF THE GEOLOGICAL SURVEY BRANCH OF THE DEPARTMENT OF MINES FOR THE CALENDAR YEAR—1908.

The operations of the Geological Survey for the calendar year 1908 were more than ordinarily extensive. All the provinces and territories, with the exception of Manitoba, were given special attention. The Survey itself underwent some changes in organization. New efforts were made to meet the need for more topographical work and, in most respects, the Survey has had a successful year, despite the delay in receiving appropriations.

Amongst the changes noted in the director's report is the formation of two committees. One of these, the Geological Committee, was created for the purpose of supervising carefully all geological reports and the geologic coloring of maps before printing. Whatever delay this may entail will be amply offset by increased clearness and accuracy.

The second committee, an Editing Committee for Maps, was appointed to standardize maps, settle upon scales, and examine critically all maps before they are allowed to go to the engraver.

Quite apart from the elimination of errors, the work of these committees will tend to elevate the professional standards of each number of the Survey. The desire to get a report finished often leads the geologist to hurry his material into the printer's hands before it has been sufficiently pruned. When, however, he knows that a group of his associates is empowered to correct, modify, or to reject his reports and maps, he will be by no means eager to take unnecessary chances.

This is not the only good effect that should result from the establishment of these Committees. A Committee is impersonal. The officer of the Survey, whose work is pronounced imperfect or careless, will be apt to take his medicine more cheerfully than would be possible if on one person alone devolved the task of correction. Moreover, both committees will tend to give each member of the staff a better understanding of the difficulties, discouragements and merits of his colleagues.

The director lays emphasis upon the increasing demand for economic work. "There is . . . a wide demand for the careful study of districts containing economic minerals, and this assistance the mining public can reasonably ask of the Government."

The library of the Survey is to be made more complete. Two distributing lists are to be maintained for the Survey's publications—an exchange list, on which will be placed public libraries and institutions publishing scientific reports; and a notice list of private individuals. All reports and maps issued will be sent to

addresses on the former list; to the latter, notices of all publications as they are issued, and such publications as are requested therefrom.

Cabinets of representative Canadian rocks and minerals, prepared by members of the Survey staff, have proved most acceptable to educational institutions both here and in Great Britain. With the better facilities provided by the new building this branch of the Survey's activities will be greatly expanded.

The desirability of co-operation with the various Provinces is forcibly touched upon. It is pointed out that contoured topographical maps are indispensable, not only from a geological point of view, but also from many other standpoints. The benefits are equally shared by the Dominion as a whole and by the individual Province. Provincial assistance and co-operation would enable the Survey to cover much larger areas in its season's campaign.

After alluding to certain disabilities under which officers of the Survey labor, the director expresses his unqualified opinion that the salaries paid are far too small. In the United States Geological Survey the salaries range from \$6,000 down. The majority of responsible officers receive from \$4,500 to \$3,000. This standard has been recognized as inadequate and steps are being taken to raise it. In the Canadian Survey salaries are little more than half as large as those paid to United States officials. That the position of the Canadian Survey is unsatisfactory and undignified hardly need be stated. That it cannot hope, while the present rates of remuneration are maintained, to retain the proper type of technical employee is absolutely certain. This matter has been brought to the attention of the Dominion Government time and time again. It is hard to understand what possible reason the Government can have for prolonging a condition that will very soon bring loss and discredit upon the whole country.

It is not expedient to take up many other topics touched on by the director. We cannot refrain, however, from bringing to the attention of the Minister and the Director the fact that the Eastern Provinces are still waiting for an official visit. Last year both of these gentlemen visited the mining centres of Alberta and British Columbia. A similar tour through Ontario, Quebec and the Maritime Provinces would be beneficial to the Department and to the mining industry.

The tone and contents of the Summary Report show that Director Brock is performing the duties of his office with vigour, tact, and a degree of vision that is, perhaps, remarkable. Already the Survey has been largely removed from the sphere of political influence. Its field is being widened, its standard raised, and it is becoming what it should be, a connecting link between the mining industry and the public.

## RECIPROCITY IN COAL.

To the manufacturer and to the ordinary user of fuel the cry for the removal of tariff restrictions on United States coal is seductive in the extreme. It is an easy matter to adduce fair and convincing arguments in favor of reciprocity. And one of the most cogent of these refers to the fact that the natural market for Nova Scotian coals is the Atlantic seaboard—not the St. Lawrence. Even more cogent is the statement that the collieries of British Columbia and Alberta cannot attain their proper growth until they find an open market in the Western States.

It is claimed by the advocates of reciprocity that not only would the price of coal drop immediately but that also the prices obtaining hereafter would be uniformly lower. Further it is urged that Nova Scotia could readily switch her attention to the New England market without undue present loss and with the certainty of a much larger volume of trade. It is also confidently asserted that the growing Canadian West would receive a tremendous impetus.

In all this there is much truth. It is unfortunate however, that a serious gap is apparent in the reasoning of many of reciprocity's warmest votaries. Whatever the natural markets for Canadian coal should be the fact remains that Canada has developed her eastern and western coal fields almost entirely without the possibility of seeking other than Canadian consumers. This condition was created not by Canada but by the United States. Our neighbor, realizing that sooner or later Canadian coal will be necessary to supplement its own supplies, has made tentative but very definite advances. Undoubtedly the United States desires the abolition of the tariff, both to secure in larger measure the Quebec and Ontario trade and also for the reason indicated above.

Incidentally there is remarkable unanimity in the expressed opinions of our eastern coal operators. They appear to be by no means desirous of exchanging their present markets for those of New England. It may be that they are the best judges of their own business.

Considering the question from a national point of view, we believe that Canada has much to gain by restricting the exportation of raw material. The coal mines of Alberta and British Columbia will be a greater or less source of wealth to those provinces and to the nation generally, in proportion as greater or less quantities of their product are used by Canadian enterprises. Naturally this holds true also of Nova Scotia.

As regards the specific arguments advanced by free-traders, it is not amiss to request an answer to certain questions. Two of these questions, probably the most effective, are these: Has Canada any guarantee that the reciprocity in coal would continue in force for more than a limited period? Is there any certainty that the removal of the tariff would mean a corresponding permanent reduction in the price of coal? I



also pertinent to enquire as to whether the next generation of Canadians will be losers or gainers through any step taken now.

The whole problem must be worked out, not with an eye to the most rapid development and exhaustion of our coal deposits, but in a manner that will best preserve the future greatness of Canada and the Empire.

### POINTS OF VIEW.

It is true of coal mines and iron mines that the annual net profit—when there happens to be a profit—is small indeed compared with the total cost of production. For this reason, other things being equal, it is not a matter of grave moment whether the stock of the Crow's Nest Pass Coal Company is controlled by Americans, Germans, Kurds, or Hindoos. The principal consideration is that these important collieries be developed economically and adequately. Unless radical changes are made in our tariff relations with the United States the market for Crow's Nest Pass fuels will be confined more or less to its present geographical limits. As a business venture, the profits accruing to its shareholders are not alarmingly large. Its operations, however, furnish a livelihood for more than 2,500 men, and its coke is essential to the smelting industries of Southeastern British Columbia.

Roughly, for every dollar of dividends that these collieries earn for the company's shareholders, ten or twelve dollars are spent in Canada. Thus a demand for machinery, supplies and merchandise of all kinds is created. Briefly, the benefits that Canada as a whole derives from such large mining concerns are immediately greater than the profits reaped by all the shareholders can ever be.

Our contemporary, "The Financial Post of Canada," has been scolding about United States control of Crow's Nest Pass. It has reflected with pointless wrath upon the recently appointed president. The "Post" is confounding patriotism with provincialism.

### INSPECTION OF MINES.

Our Cobalt correspondent calls attention to the need of a resident Inspector of Mines in the Cobalt district. At present Ontario employs only one Inspector. As our correspondent points out, it is impossible for that official to enforce his recommendations. Although his powers are wide it is out of the question to think that his orders will be observed by mine operators who may see him only once or twice in six months. Indeed, it is impossible for one man to cover the Province of Ontario as closely and as frequently as conditions demand. No matter what penalties may be imposed upon those who disregard the requirements of the Mines Act, it is obvious that the proper enforcement of these regulations in a district like

Cobalt requires the constant presence of a Government official.

We believe that this is a matter that should engage the immediate attention of the Ontario Bureau of Mines. The unnecessary sacrifice of human lives must not be tolerated. Lives will continue to be sacrificed unless a thorough system of inspection is inaugurated.

Inspector Corkill has proved himself a competent and trustworthy man. But far too much is expected of him. It is time that he were given a corps of assistants.

### EDITORIAL NOTES.

The Cobalt Branch of the Canadian Mining Institute has sprung into new life. A reading-room and library are to be opened for the benefit of members and visiting mining men. A complete collection of ore and rock specimens is to be displayed. The branch will be supported entirely by local subscriptions, entirely distinct from the general funds of the Institute.

Dr. Milton L. Hersey has donated \$10,000 to the Metallurgical Department of McGill University. The revenue from this sum is to be applied to the purchase of special apparatus for research work in processes. It will be remembered that Dr. Hersey recently gave a similar amount to the School of Mining, Kingston. These are examples that might well be followed by a few more Canadians.

Mexico has declared her ability to take care of herself in mining matters. There is now in process of organization a Mexican Institute of Mining and Metallurgy, a society closely resembling in constitution our own Canadian Mining Institute. Annual and monthly meetings are to be held in the Mexico City. The membership comprises three classes, namely, members, associate members and honorary members. The proceedings will be published in Spanish, but it is specially provided that any member can make a motion, present a paper, or enter into discussion in either English or Spanish. Such motions, discussions, and papers will be printed in the language in which they are submitted.

### MONEL METAL.

It is claimed for the new alloy, monel metal, produced by the International Nickel Company, that it possesses 25 per cent. greater tensile strength and 50 per cent. greater elastic limit than the best rolled steel, with the superadded quality of incorrodibility. In chemical composition it is as follows:—

Nickel—68 to 72 per cent.  
Iron—0.5 to 1.5 per cent.  
Sulphur—0.014 per cent.  
Carbon—0.073 to 0.15 per cent.  
Copper to balance.

The new alloy is silver white, takes a brilliant polish and retains it indefinitely. It is finding many uses.



# COAL MINING IN ALBERTA DURING THE YEAR 1908.

## DEVELOPMENT OF OLD MINES AND OPENING OF NEW.

The Province of Alberta is fast becoming a considerable contributor to the coal output of the Dominion. In the year 1906 her production was 811,228 tons. Last year, 1908, the output amounted to 1,845,000 tons. That this is but slight increase—10,225 tons—over the returns for 1907, is due to adverse trade conditions. The number of new mines opened and the addition to the equipment of mines already operating indicate that Alberta is preparing for largely increased activities.

The classification of output shows that bituminous coal still preponderates. The figures for the past two years stand thus:—

|                      | 1907.     | 1908.     |      |
|----------------------|-----------|-----------|------|
| Lignite . . . . .    | 639,335   | 584,334   | tons |
| Bituminous . . . . . | 939,295   | 1,011,571 | "    |
| Anthracite . . . . . | 256,115   | 249,095   | "    |
| Totals . . . . .     | 1,834,745 | 1,845,000 | "    |

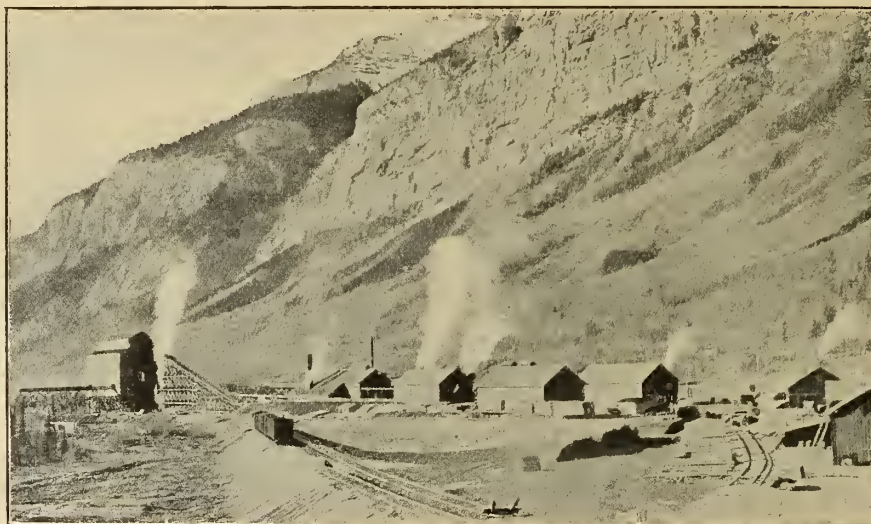
coking coals. Towards the east the high-grade lignite coals are found.

A few notes as to improvements and additions to plants may now be given.

**International Coal and Coke Co., Ltd., Coleman.**—Additions have been made to the screening plant. These comprise new picking tables, conveyors, and screens. One high pressure Canadian Rand air compressor was installed and two compressed air locomotives acquired; 40 beehive ovens were added.

**Bankhead Mines, Ltd., Bankhead.**—One additional 150 h.p. Robb boiler was installed. A new unit of briquetting plant, capacity 300 tons of briquettes in 24 hours, was erected.

**Hillcrest Coal and Coke Co., Ltd., Hillcrest.**—A new boiler and power house has been erected at the foot of the tippie. Safety lamps and electric lights are now in use in the mines.



SURFACE PLANT OF BANKHEAD MINES, LTD., BANKHEAD, ALTA.

The production of coke and briquettes is as follows:—

|                                | 1907.   | 1908.   |
|--------------------------------|---------|---------|
| Coal used in coke production.. | 112,887 | 128,397 |
| Coke produced . . . . .        | 73,782  | 75,657  |
| Briquettes produced . . . . .  | 49,585  | 36,261  |

During 1908 there were 112 coal mines in operation. Of these 19 were opened during the year. Two old mines were reopened, and six mines were abandoned.

Out of the 112 operating mines, only nine are producing bituminous coal. One, Bankhead Mines, Limited, is an anthracite mine; all the rest are producing lignite. All of the nineteen new mines opened are working lignite. From the figures of production given above, it is apparent that the majority of the lignite mines are small concerns.

Coal is being mined in the south practically from the eastern to the western boundary. In the west large bituminous mines produce both steamcoals and

**H. W. McNeill Co., Ltd., Canmore.**—A complete high pressure compressed air plant and compressed air locomotives have been installed. This has reduced the number of horses necessary for underground haulage.

**Canadian American Coal and Coke Co., Ltd., Frank.**—New screens and new electric light plant have been installed at this mine.

**Galbraith Coal Co., Ltd., Lundbrek.**—Wolff safety lamps and Monobel powder have been introduced here.

**West Canadian Collieries, Ltd., Blairmore.**—At the Bellevue mine a new tippie has been erected, equipped with cross-over dump and picking tables, capable of handling one thousand tons per day. An electric light plant for lighting tippie, mine buildings, and main gangway of mine, has been installed. Wolff safety lamps are now employed, and all blasting is done by qualified shotlighters.

**Alberta Railway and Irrigation Co., Lethbridge.**—This company have added to their No. 3 plant one 125 h.p. and one 175 h.p. Robb-Mumford boilers. At their No. 3 mine two new shafts have been put down, and



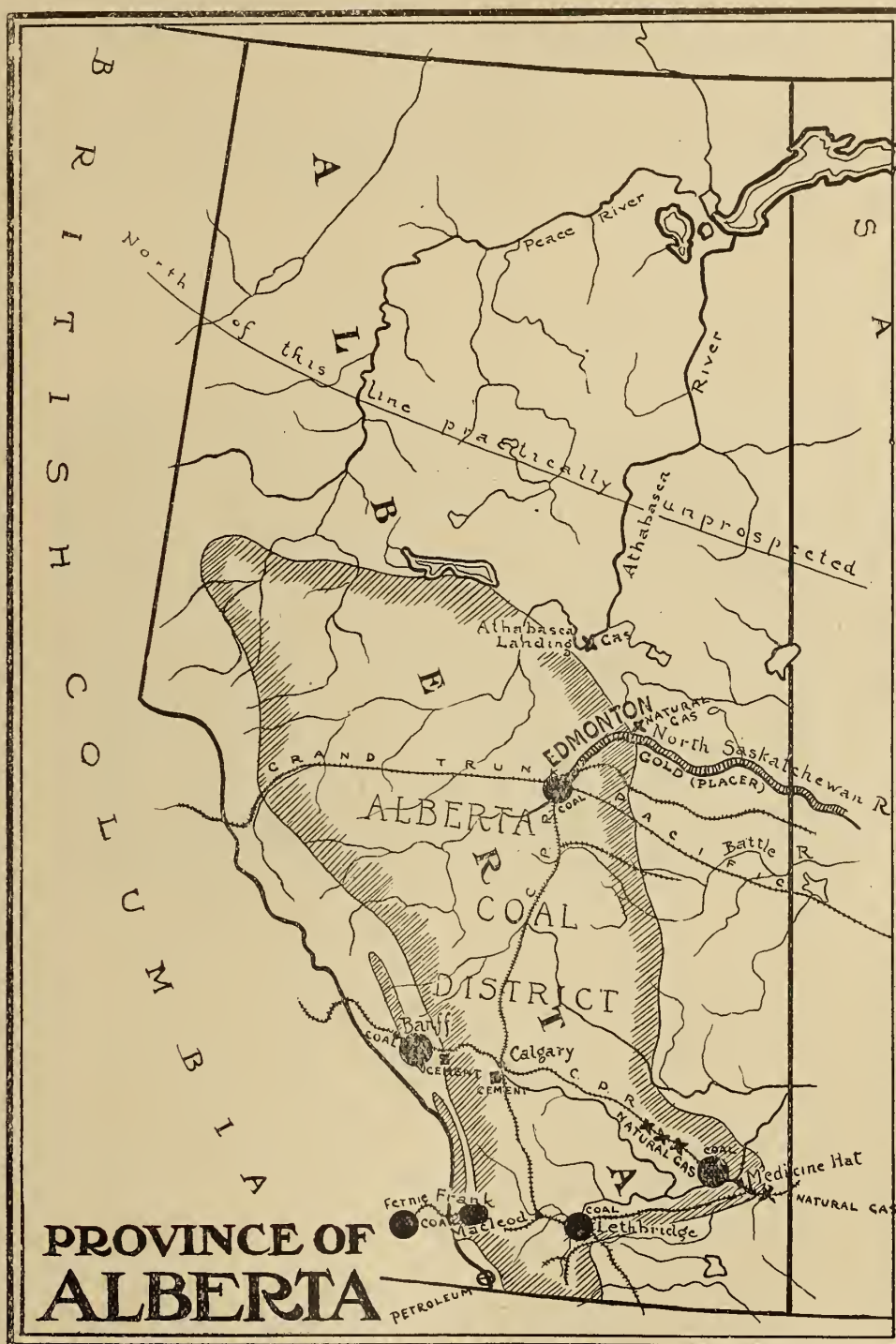
much new plant installed. A new steel tippie, capacity 1,800 tons per day, is in course of erection.

**Diamond Coal Co., Ltd., Diamond City.**—Brick buildings have been erected and, amongst other machinery, are a 275 h.p. haulage engine, three 150 h.p. Robb-Mumford boilers, a pumping station, and considerable electrical equipment. One Morgan-Gardner

compressed air punching machines. All main haulage roads and air courses have been enlarged.

**Royal Collieries, Ltd., Lethbridge.**—A branch railway now connects this colliery with Lethbridge, six miles to the south. A tippie, 400 tons per day, has been completed.

In the Edmonton district a considerable amount of



electric coal cutter and one Jeffrey electric coal cutter are in commission. The tippie is designed to handle an output of 1,000 tons per day.

**Canada West Coal Co., Ltd., Taber.**—At this mine the daily output has been increased to about 700 tons per day. Electric coal cutters have been replaced by

coal is produced for local domestic and manufacturing purposes. Most of the towns along the Canadian Northern Railway as far east as Saskatoon are supplied with fuel from these mines. Some of the larger enterprises are the following:—

**The Alberta Coal Mining Co., Ltd.,** operates at Car-

diff. The mine is equipped with a double drum Flory hoist and a first-class screening plant. The output is now about 100 tons per day. An output of 500 tons per day is aimed at.

The Cardiff Coal Company, Ltd., is one of the largest producers in the district. This company is working a lignite seam about 15 feet in thickness, lying at a depth of from 18 to 40 feet from the surface.

The Twin City Coal Company, Limited, has one of the best equipped mines in the district. A complete compressed air plant and outfit of coal cutting machines has been acquired.

The Clover Bar Coal Co., Limited, through whose property the G. T. P. has built its line, is to be worked on a large scale.

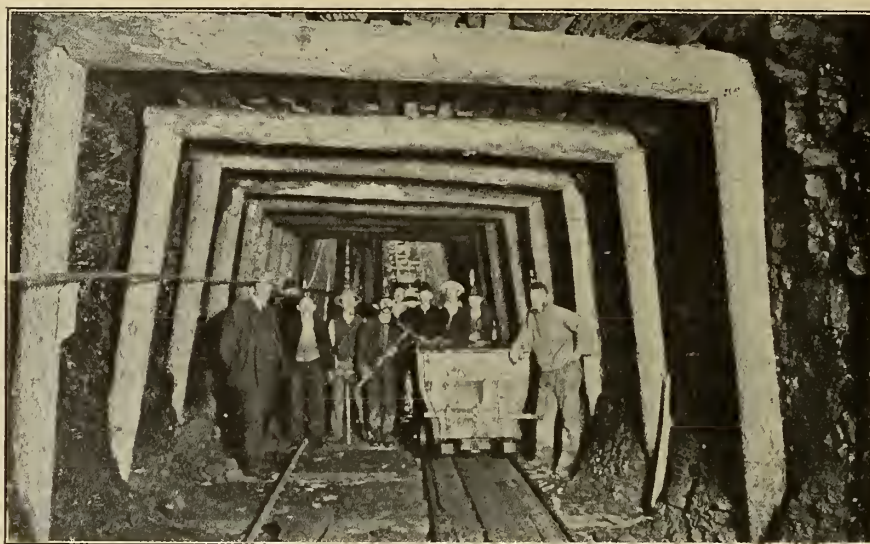
#### Accidents.

The Provincial Inspector of Mines reports less and less opposition to the introduction of safety lamps. "Some of the operators have objected to the use of safety lamps on the ground that the illumination given by the safety lamp is inferior to that given by the open light, thus causing miners to be more liable to accident,

Of a total of 62 accidents, 11 were fatal, 38 were serious, and 13 were slight. A comparison with 1907 is interesting:—

|                                                            | 1907. | 1908. |
|------------------------------------------------------------|-------|-------|
| Average number of persons employed inside the mines .....  | 2,700 | 2,681 |
| Average number of persons employed outside the mines ..... | 900   | 1,099 |
| Number of fatal accidents inside the mines .....           | 17    | 11    |
| Number of fatal accidents outside the mines .....          | 2     | Nil   |
| Number of non-fatal accidents inside mines .....           | 75    | 43    |
| Number of non-fatal accidents outside the mines .....      | 11    | 8     |

The absence of fatal accidents above ground, and the fact that only 11 fatalities occurred underground, are most praiseworthy. What fatal accidents did occur are thus classified:—



UNDERGROUND WORKINGS OF THE ALBERTA COAL MINING CO.'S MINE, CARDIFF, ALTA.

as with the inferior light they could not make such a thorough examination of their working places. This statement may hold true with regard to the earlier forms of safety lamps, but it is generally conceded that with the improved lamps at present on the market a sufficiently good illumination is obtained to enable the miner to make a thorough examination of his working place.

"Owing to the introduction of safety lamps the number of small burning accidents has been greatly reduced within the past two years, and in no case have we any record of there being an explosion caused by a safety lamp igniting gas in a mine."

The past year saw a considerable decrease in the number of accidents. The most serious occurred in the No. 1 mine of the H. W. McNeill Co., Ltd., where three men lost their lives in an explosion of gas from the Carey seam. The accident was due to the utter disregard of orders on the part of a certificated shotlighter, who fired a shot charged with dynamite when he had instructions to see that only, Negro Powder was used. Lax discipline is noted as one of the contributory causes.

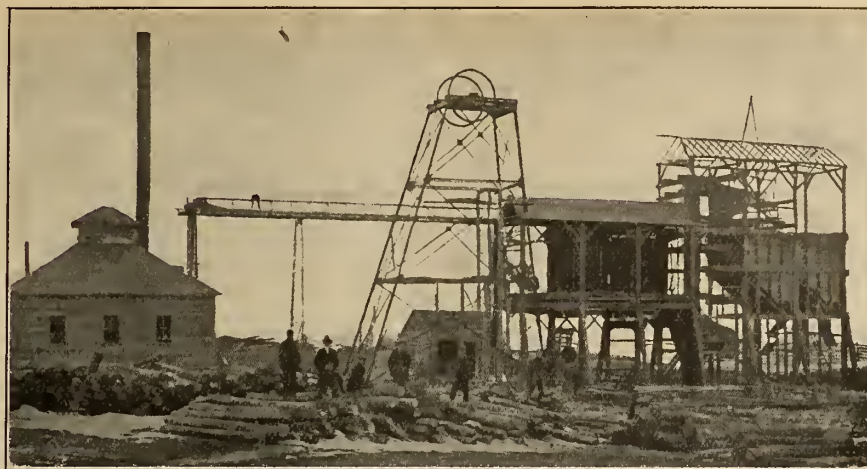
|                              |    |
|------------------------------|----|
| Fall of roof and sides ..... | 4  |
| Gas explosion .....          | 5  |
| Mine cars .....              | 1  |
| Miscellaneous .....          | 1  |
|                              | 11 |

The serious accidents fall into the following groups:—

|                              | Serious Accidents. |        |
|------------------------------|--------------------|--------|
|                              | Above.             | Below. |
| Fall of roof and sides ..... | —                  | 12     |
| Gas explosion .....          | —                  | 6      |
| Mine cars .....              | —                  | 10     |
| Explosives .....             | 1                  | 1      |
| Falling down chutes .....    | —                  | 1      |
| Miscellaneous .....          | 5                  | 2      |
|                              | 6                  | 32     |

The rate of fatalities below ground is 4.1 per thousand men employed, as compared with 6.30 per thousand in 1907.





BRECKENRIDGE &amp; LUND COAL CO.'S PLANT AT LUNDBRECK, ALTA.

### Prospecting.

In the remote districts of the province a large amount of prospecting has been done during the year. Throughout the prairie country a number of bore holes were put down. But the largest undertakings are carried out in the mountainous regions towards the western boundary of the province, where the German Development Company, the Kananaskis Coal Company, Limited, and the Canadian Northern Railway Company, Limited, have been active. The first-named company has had a force of men in the field all summer, and many valuable seams of coal have been opened up

on their Kananaskis, Big Horn, and Brazeau coal lands. It is reported that the C. N. R. will shortly build a line into the Brazeau coal fields. This will provide a new source of bituminous coal for railways in the north.

The Inspector, in concluding, mentions last year's visit of the Canadian Mining Institute excursion as having given wide advertisement to the mineral resources of Alberta.

The wage scale obtaining during 1908 was practically identical with that in force during 1907. The latter schedule will be found in the Canadian Mining Journal for September 1st, 1908.

## PETROLEUMS AND COALS.

Compared in Their Nature, Mode of Occurrence and Origin.

By Eugene Coste, E.M., Toronto.

(Printed as an advance paper of the Canadian Mining Institute.)

There is found in nature a great variety of compounds of carbon, not only in the sedimentary strata of all ages, but also in crystalline rocks, in igneous and volcanic rocks, in seams and veins through all these, and even in meteorites.

All these carbon-compounds have been assigned by many geologists as having the one and the same origin, namely, an organic origin from the decomposition of distillation of either animal or vegetable organic matter entombed in the strata, and they have all been grouped and classed into the one and the same series of compounds of carbon.

This organic origin cannot, of course, hold good for the natural carbon-compounds found in crystalline rocks, in igneous and volcanic rocks, in volcanic gaseous emanations, in metallic seams and veins where they are intimately associated with such minerals as quicksilver, for instance, and also when they are found in meteorites. It has, therefore, always seemed to me that this idea of only one natural series of compounds of carbon with an organic origin is so clearly at variance with so many well-known geological facts and physical laws that I cannot cease to wonder how it is possible for such a huge error to have taken the firm root it has in the science of geology. In two papers

which I read before this Institute, one nine years ago<sup>1</sup> and one six years ago,<sup>2</sup> and in another paper which I read in 1904 before the American Institute of Mining Engineers<sup>3</sup> and before the Franklin Institute,<sup>4</sup> I entered my strong protest against this fallacy. I pointed out in these papers the solfataric volcanic origin of the natural hydrocarbons or petroleum. Other geologists have also long ago given proofs of the inorganic origin of petroleum, especially Berthelot, Mendeleef, Eli De Beaumont, De Lapparent, and a number of other writers, mostly French and Russian.

But it evidently takes a long time to establish definitively even simple and palpable truths in science, as may be judged from some of the recent literature on the subject<sup>5</sup> in which the derivation of the natural hydrocarbons from organic matter is either again admitted without discussion or again sought to be proved. It appears, therefore, necessary that some of

<sup>1</sup>Journal Can. Min. Inst., Vol. III, 1900, pp. 68-89.

<sup>2</sup>Journal Can. Min. Inst., Vol. VI, 1903, pp. 73-128.

<sup>3</sup>Trans. Am. Inst. Min. Eng., Vol. XXXV, pp. 288-297.

<sup>4</sup>Journal Franklin Institute, Philadelphia, 1904.

<sup>5</sup>The Data of Geo. Chemistry, Bulletin No. 330, U.S. Geol. Survey, pp. 619-641. See also U.S. Geol. Surv., Bul. No. 250, 265, 282, 285, 300, 309, 317, 318, and others.



the facts in the case be once more presented, and I have adopted in this paper the comparative form, between coals and petroleum, in the hope that it will bring out more forcibly and more clearly how entirely and absolutely different some of the natural carbon-compounds are to others in their nature, their mode of occurrence and their origin, and in the further hope that it will demonstrate that there are really two series of natural compounds of carbon, namely the organic or the coal series, or coals, and the volcanic or petroleum series, or petroleum.

### Nature.

**Coal Series.**—The coal series includes the natural carbon-compounds grading into one another from vegetation into peat, lignite, soft coal, semi-anthracite and anthracite. The exact chemical nature and proximate constitution of the members of this series are imperfectly known, and are not yet fully made out, but they are nevertheless established to be complex oxidized carbon compounds grading from definite carbo-hydrates into carbon-compounds richer and richer in carbon and poorer and poorer in oxygen as the natural carbonizing process of vegetation proceeded, the end product, anthracite, still retaining, however, some  $2\frac{1}{2}$  per cent. to 3 per cent. oxygen.

One hydrocarbon, namely, marsh gas or methane, is known to form during the natural decomposition of vegetation into coals; this is the only hydrocarbon thus formed. Many other gaseous or liquid hydrocarbons may be produced by the destructive distillation of carbonaceous matter or of coals, but these have nothing to do with the carbon-compounds formed in Nature by the normal geological processes as the destructive distillation of the sedimentary strata and of its carbonizing vegetation is not a normal geological process and never took place. This is conclusively proved by all the undistilled lignite and coal beds of the sedimentary strata all over the world and by the want of coke beds in these strata.

It may be well to point out here also that coal beds, being more or less porous strata, may and no doubt have been impregnated, in places, with gaseous and liquid petroleum, and hence these particular beds of coal, in these places, will be found really to contain natural hydrocarbons, but these are the result of a secondary enrichment by impregnation of the original coal deposit. These cases are, however, the exception, and do not in any way affect the problem, except as exceptions do, namely, to prove the rule.

**Petroleum Series.**—The petroleum series includes all the natural hydrocarbons, with the exception of marsh gas, above mentioned. These petroleum grade from natural gas into fluid crude oil or petroleum proper, into semi-fluid maltha and into viscous or solid bitumen or asphalt in their many varieties, of which such minerals as grahamite, gilsonite, elaterite, napalite, ozokerite, albertite, anthraxolite, are only a few. As the end products of this petroleum series there are good reasons, as we will see, to include both graphite and diamond, whose deposits prove that they also have had a similar inorganic origin.

A good definition of the nature of petroleum is the one of Mabery,<sup>1</sup> as follows: "Petroleum, from whatever source, is one and the same substance, capable of a simple definition—a mixture in variable proportions of a few series of hydrocarbons, the product of any particular field differing from that of any other field

only in the proportion of these series and the members of the series."

Mabery referred, I believe, in the above definition only to the crude oil or petroleum proper, but it applies equally well to natural gas, to maltha and to viscous or brittle solid asphalt; and it may be said, therefore, that all the members of the great petroleum series, as here understood and defined, are mixtures of different hydrocarbons in greater or less variety.

### Mode of Occurrence.

**Coals.**—With regard to the mode of occurrence of the members of the coal series it is only necessary for the purpose of this paper to note that they are always found in regular beds of the sedimentary strata, spreading far and wide uniformly often over hundreds and even thousands of square miles. The marsh gas of the decomposing vegetation has partly escaped into the atmosphere in the early part of the process or possibly even later, if the folding, fissuring and faulting of the coal measures have been strong, as, for instance, in the anthracite fields of Pennsylvania. What marsh gas did not thus escape, however, has not mysteriously transformed itself into the mixture of the many varieties of hydrocarbons constituting petroleum, but it is still found as marsh gas right in the coal from which it originated and where it becomes to-day the dreaded fire damp of the coal miner, often mixed with considerable choke damp or carbonic acid and with considerable nitrogen. This gaseous mixture is a very different gas from the mixture of hydrocarbons constituting natural gas; it is never, like natural gas, associated with liquid petroleum and with large quantities of very strong salt and sulphur waters, and can only be confused with it by superficial observers.

There is only one more point which I think pertinent to make here with regard to the mode of occurrence of the coals, and that is that no coal beds are found below the Carboniferous period. A small amount of coal or carbonaceous matter is, however, found in some of the Devonian shales, but this never passes into pure coal beds and fewer and fewer of these carbonaceous shales are found in the Silurian and Cambrian. The science of geology has always interpreted and explained this fact, that so little coal is found below the Carboniferous, on the undersanding that before Carboniferous time the conditions for the existence of considerable growth of vegetable matter were unfavorable, and it is a geological heresy to speak of or to believe in coal beds existing in formations lower than the Carboniferous; geology teaches us that they cannot and do not exist there. How is it then that there are so many large deposits of petroleum below the Carboniferous? It could not be, since there was so little vegetable or other organic matter entombed in these early strata, unless their origin is not in any way organic.

**Petroleum.**—If the mode of occurrence of coals is well understood, I may say by all, the mode of occurrence of petroleum certainly is not, and hence the great misunderstanding by so many about the origin of the latter. Instances are multiplying in which the natural hydrocarbons are found in emanations clearly volcanic and in igneous and volcanic rocks that is in places "where they have no business to be,"<sup>2</sup> according to those who believe in and support the organic origin of petroleum.

Still these petroleum are found often in such places, and no well-informed geologist can ignore this fact or

<sup>1</sup>Journal Am. Ch. Soc., 1906, XXVIII., p. 417.

<sup>2</sup>G. R. Mickle, Journ. Can. Min. Inst., Vol. VI., p. 123.



refuse to take account of it. Some geologists have passed such, to them, unwelcome cases over with the remark that the petroleum in the igneous or volcanic rocks were no doubt due to the distillation of the bituminous shales cut through by the intrusions; but how can a hot rock distill or drive away a vapour into itself? Some new principles in physics would have to be invented to permit of this explanation, which is simply a contradictory use of language and not a logical argument. It is also a fallacious reasoning, a reasoning in a circle, to attribute the origin of oil to bituminous shales or to shales containing oil, that is to say, to oil. In one of my previous papers<sup>1</sup> on this subject before this Institute I cited a good many instances of petroleum in volcanic emanations or in igneous or volcanic rocks, and I now refer you to this paper for full particulars of these, but I will recapitulate here what these instances prove beyond all doubt:

1st. The occurrence of graphite in igneous gneisses, granites, gabbros, pegmatite dykes, and in a quartz-porphry dyke.

2nd. The occurrences of hydrocarbons in the gaseous inclusions of the crystals of igneous rocks.

3rd. The occurrence of petroleum (liquid, semi-liquid and solid) in greenstone traps, in basalts, in trachytes, in dolorites and other volcanic rocks.

4th. The occurrence of diamond and gaseous hydrocarbons in volcanic necks and pipes.

5th. The occurrence of gaseous and liquid petroleum in the volcanic emanations of to-day.

6th. The occurrence of petroleum in freshly ejected scoriae from the volcano Vesuvius.

I will now in confirmation of the above cite a few other direct proofs of the occurrences of petroleum in crystalline rocks, in volcanic or igneous rocks or in close connection with these, and in metalliferous veins.

1st. Oil in crystalline gneiss. In Placerita Canyon, five miles east of Newhall, Los Angeles County, California, a very light oil, almost naphtha, of a gravity between 50° and 60° B., is produced from crystalline gneisses which overlay the San Gabriel granite.<sup>2</sup> It was discovered in shafting for gold. There are seven wells there, producing from depths of between 400 and 1,100 feet, one of them yielding between five and six barrels per day of oil, with 30 or 40 barrels of salt water, and another one spouted high when the oil was first struck. The crystalline schist or gneiss in which the oil occurs is micaceous and granitic, conspicuously banded and greatly contorted.

2nd. Oil and bitumen in the quicksilver deposits of California. The occurrence of petroleum in the Redington quicksilver mine, New Idria, Cal., and in the other quicksilver mines of that State, has been reported by Luther Wagoner,<sup>3</sup> Prof. Egleston,<sup>4</sup> Becker,<sup>5</sup> Prof. Christy,<sup>6</sup> and many others; it occurs abundantly as liquid oil, viscous tar, solid asphalt, and also in the gaseous state of natural gas intimately associated in the veins with the cinnabar and with metallic native mercury. Many other instances of petroleum found in quicksilver veins in Europe and in other metallic veins could be cited, in which the solfataric volcanic origin of not only the mercury or other metals, but also of the petroleum, is very apparent. The petroleum in such

deposits cannot possibly have an origin different from that of the metals themselves.

3rd. Graphite and natural gas in the metalliferous vein of Silver Islet, and graphite in the veins at Cobalt and Ducktown, Tenn. The natural gas and graphite found in abundance at the Silver Islet mine has often been cited.<sup>1</sup> Graphite was found there not only in the metalliferous vein intimately associated with rich native silver, but also in the norite or gabbro dyke accompanying the vein. At Cobalt, graphite is also found in many of the complex cobalt-nickel arsenides and silver veins.<sup>2</sup> Prof. J. F. Kemp, in his paper<sup>3</sup> on "The Deposits of Copper Ores of Ducktown, Tenn.," says "graphite or some closely related carbon-mineral is met in occasional specimens of the ore of the Mary mine. It appears to specially favor the crushed masses, and was probably of late introduction. It not only forms fine leaflike aggregates, but in this section may be detected by the microscope as minute spheroids in the midst of other minerals, such as calcite and chalcopryrite. It must have been introduced as some gaseous or very mobile liquid hydrocarbon, which has penetrated into minute cavities and filled larger cracks, and has been subsequently changed to graphite."

4th. Solid petroleum in pegmatite dykes and certain veins associated with uranium, radium and vanadium. J. Obalski, in a very interesting paper read before the 1904 meeting of this Institute,<sup>4</sup> mentioned the fact that he found in a pegmatite dyke worked for mica a radio-active carbonaceous material burning quite easily and leaving ashes containing oxide of uranium, and also that he found in the same dyke some "eleve-ite," an ore of uranium strongly radio-active and containing one-tenth of a milligram of radium. Similar so-called "coals," which are, however, solid hydrocarbons or petroleum, are found in veins in Peru,<sup>5</sup> and are mined for the vanadium they contain; these veins form lenses of "asphaltite" or solid petroleum from 0.5 inches to 22 feet wide and as much as 500 feet long, in a well-defined belt 15 miles long in the Yauli district, Peru; they are parallel and in close proximity to an obsidian intrusive dyke. In the Quespi district, Peru, there is another deposit of solid petroleum, forming also a lens-shaped mass with a maximum width of 28 feet and length of 350 feet, occupying one of the faults of a quartz porphyry dyke. Similar occurrences of hydrocarbons containing vanadium and uranium have been cited by other writers.<sup>6</sup>

5th. Graphite, diamond and hydrocarbons in meteorites. It is well known that pure carbon in the form of graphite and diamond has often been found in meteorites,<sup>7</sup> but it is not so well known that hydrocarbons have also been found in them, as cited by N. V. Sokoloff.<sup>7</sup> C. Tschermak also reports 0.85 per cent. of hydrocarbon in the meteorite which fell at Goalpara, India.<sup>7</sup>

6th. Oil and natural gas in volcanic rocks in Europe, Africa and Mexico. O. Silvestry<sup>8</sup> has found both liquid

<sup>1</sup>Eng. and Min. Jour., Vol. XXXIV, pp. 320, 323, 453. See also Ore Deposits of the U.S. and Canada, by J. F. Kemp, p. 283, and Eng. and Min. Jour., Vol. XXIII, pp. 54, 55 and 70, 71.

<sup>2</sup>Prof. W. G. Miller, Bureau of Mines Report, Ontario, 1907, Pt. II.

<sup>3</sup>Trans. Am. Inst. Min. Eng., XXXI, 261.

<sup>4</sup>Jour. Can. Min. Inst., Vol. VII, pp. 245-256.

<sup>5</sup>Bulletin Am. Inst. Min. Eng., No. 27, March, 1909, pp. 291-316.

<sup>6</sup>See Bulletin U.S. Geol. Surv., No. 330, pp. 611-616.

<sup>7</sup>See Bulletin U.S. Geol. Surv., No. 330, p. 632.

<sup>8</sup>Gazz. Chim. Ital., Vol. 7, p. 1, 1887; Vol. 12, p. 9, 1882.

<sup>1</sup>Journ. Can. Min. Inst., Vol. VI., 1903, pp. 73-128.

<sup>2</sup>Bulletin U.S. Geol. Surv., No. 309, pp. 100-104.

<sup>3</sup>Eng. and Min. Jour., Vol. XXXIV, p. 334.

<sup>4</sup>Trans. Am. Inst. Min. Eng., iii, p. 273.

<sup>5</sup>U.S. Geol. Surv. Monograph, xiii, pp. 371-373.

<sup>6</sup>Trans. Am. Inst. Min. Eng., xiii, pp. 547-548.



oil and a solid paraffin in basaltic lavas near the volcano Etna. Similar occurrences have often been cited from other parts of Europe, as, for instance, in Hungary,<sup>1</sup> where liquid petroleum, asphalt and bitumen are found in rhyolite tufts, rhyolitic quartz-trachyte and andesite. On the Elansdraal farm,<sup>2</sup> Hopetown district, Cape Colony, South Africa, two dolerite intrusive sheets were traversed in a well between the depths of 121 and 137 feet, and of 364 and 401 feet, and both were found to be rich in oil in their cracks and crevices. Many other dykes and sheets of intrusive rocks in Central British South Africa are also found richly impregnated with oil.

I have myself examined similar occurrences in dolerite dykes and in calcite veins running across upper Cretaceous strata in the State of Chihuahua, Mexico.

7th. Natural gas in serpentine,<sup>3</sup> Asiatic Turkey. On the southwestern coast of Asia Minor, north of Cape Chelidonia, is the famous Chimaera, or "stone that burns," of the ancient Greeks. Here gases are continually disengaged from fissures, and are known to have been burning for at least 2,800 years, as the phenomenon was described by Hesiod before the time of Homer. According to the Russian geologist, Tschiatehaff, the gas is emitted from fissures in an altered igneous rock (serpentine), which is intrusive in limestone.

8th. The occurrence of oil around volcanic necks, Mexico. As described by Ezequiel Ordóñez,<sup>4</sup> in the State of Tamaulipas, Mexico, in the Gulf Coast lands, the oil deposits are found around vertical borings, chimneys or pipes drilled upward through undisturbed and almost horizontal shales by volcanic action during the Pliocene and perhaps Post-Pliocene times, and forming small isolated cones ranging from a few feet to four or five hundred feet in height. These cones of volcanic origin spread over the coastal peneplain, and consist either of solid basaltic lava or of basaltic tufa. At the base of these cones, or in their neighborhood, are to be found the greater number and more important seepages of oil. The Mexican Petroleum Company, at Ebano, near Tampico, have obtained their more productive wells at the base of the tufaceous cones, such as the Cerro de la Pez, where from but very few wells around this hill they have secured a daily output of 6,000 barrels. In the more highly productive wells of this company the heavy oil, abundantly charged with gas, carries a sandy material, consisting of small sharp pieces of shale, fine lapilli, and volcanic sand. The conditions above described as to the occurrence of oil prevail in an extensive zone of the Gulf-Coast lands, and extend further south in Mexico to the northern half of the State of Vera Cruz. Any number of cones, peaks and pyramids of volcanic origin are here also distributed over the coastal plain, piercing through very slightly folded or undulated strata of shales, interbedded with limestones and sandstones in thin layers, the whole probably of Upper Cretaceous age. The oil seepages are always found here also around the volcanic hills, but more frequently near the isolated volcanic peaks than in places where such peaks are closely grouped and surmounted on large bases which are composed of lava streams, preventing the oil from seeping out to the surface. Mr. Ezequiel Ordóñez further says:<sup>5</sup> "In the coastal plain lying between Tampico,

Tuxpan and Papantla will be found the greater number of volcanic hills, and the more important and densely distributed oil seepages of Mexico. I shall name a few of them. Near the Laguna de Tamiahua there exists a large pool of asphaltic oil, close to the twin volcanic hills known as Los Hermanos. Not far from the Sierra de Tantima is another big dry asphaltic lagoon. On the Hacienda de Tiacolula we found two oil seepages, one on either side of the basaltic hill called Temaxcales. The large volcanic mountain near the Hacienda de Tamatoco gives birth to several exudations of oil; on the eastern side, and not very far from its base, is found one of the larger seepages, named La Chapopotera de Juan Felipe, having an extent of one-half mile. The Chapopotera de Cerro Viejo, those of the Hacienda del Chapopote and others nearer Tuxpan are also extensive and important." It is along the Laguna de Tamiahua, mentioned by Mr. Ordóñez as affording a large seepage of asphaltum oil close to the twin volcanic hills known as Los Hermanos, that S. Pearson & Son's wonderful and uncontrollable oil gusher<sup>1</sup> has since been drilled in a property known as the San Diego de la Mar, at a point on the lagoon known as Dos Bocas. The first well drilled on this property by the firm of Pearson & Son came in at 2,005 feet, with an estimated production of 5,000 barrels of oil daily. The second well came in on July 4th, 1908, at a depth of 1,824 feet, and the oil flow was so enormous that it lifted the 1.283 feet of 8-inch casing in the hole, and also the 43 feet of 11½ casing, and broke out in every direction on the outside of the casings, catching fire from the boiler and burning, it is said, for a time at the rate of 100,000 barrels of oil daily, and for 57 days before it could be put out by pumping sand and gravel into the crater formed around the well. Three weeks after the fire was put out the diameter of the crater was 400 feet, and soundings taken 30 feet from the sides showed a depth in places of 200 feet. Approximately two acres of earth dropped into the crater at one time from the sides. This crater later on became so big that the well was finally abandoned, and it is now a veritable geyser of oil, mud and water, throwing out, it was estimated on November 1st last, 14,000,000 barrels of an emulsion of oil, mud and water.

Other instances could be given here of petroleum deposits directly connected with vulcanism, but the one just cited is enough to prove that oil fields are not commonly remote from great indications of volcanic activity, as it has been contended,<sup>2</sup> and that on the contrary enormous quantities of oil are obtained in the porous sediments or tufaceous sands around volcanic necks. When the petroleum is found, however, in the igneous, volcanic or crystalline rocks themselves it is impossible to find more than small quantities, as the necessary porosity to store these products in large enough amounts to be economically valuable is, of course, wanting on account of the imperviousness of the crystalline texture of these rocks. These small quantities of hydrocarbons are nevertheless found in many regions all over the earth in whatever small cavities, cracks and seams are co-existent with the crystalline texture of the igneous, volcanic and crystalline rocks, and even in microscopic inclusions inside of their crystals.

On the contrary, in the sedimentary strata of all ages some of the sediments, principally sandstones, con-

<sup>1</sup>Trans. of the Inst. of Min. Eng., Vol. XXXV, Pt. 6, p. 721.

<sup>2</sup>Trans. of the Inst. Min. Eng., Vol. XXXV, Pt. 4, pp. 545, 558.

<sup>3</sup>"Mineral Industry," New York, 1902.

<sup>4</sup>Mining and Scientific Press, Aug. 24th, 1907, pp. 247, 248.

<sup>5</sup>The Mining and Scientific Press, Aug. 24th, 1907, p. 248.

<sup>1</sup>Eng. and Min. Journal, Jan. 2nd, 1909, pp. 7, 8, 9.

<sup>2</sup>The Data of Geochemistry, U.S. Geol. Surv., Bulletin No. 330, p. 633.



glomerates, limestones and sandy shales, are occasionally quite porous rocks, and therefore may and do form catch basins, tanks or reservoirs for gaseous or liquid petroleum forcing their way under strong pressure through the fractures, fissures, seams and joints of the strata. These reservoirs when thus filled constitute the important petroleum deposits, the commercial oil and natural gas fields. They are found indiscriminately in hundreds and hundreds of horizons in the strata of all ages, from the oldest Paleozoic to the alluvial gravels and sands of the Quaternary. The natural gas or igneous petroleum in these reservoirs is always found to have a heavy pressure, sometimes as high as 1,500 pounds to the square inch, and in this connection the most important factor to be noted is that this pressure in each particular field with the depth of the porous reservoir or sand containing the petroleum, indicating that its source is from below. It has been proven<sup>1</sup> beyond a doubt that this pressure is not a descending artesian or hydrostatic water pressure, the main proof being the uniformly decreasing pressure of the gas as it is being taken out; nor is it a pressure exerted by the weight of the superincumbent strata, since the gas is in the pores of firm coherent rocks not under crush. The origin of this pressure requires no explanation, and becomes self-evident when the true volcanic origin of the petroleum is understood.

Far from forming, like the coals, uniform beds spreading out uninterruptedly in every direction over wide regions, the petroleum reservoirs, on the contrary, are always found to form comparatively small, local, accidental and irregular pockets, pools or fields. In these pools or fields themselves extreme irregularity is often the characteristic of the reservoirs; patches and strips of barren and productive territory being intermixed in most intricate manners, leading often to productive wells being surrounded by dry holes, and vice versa. In many of these fields the oil and gas are obtained in a number of different sands or reservoirs, some of which are hundreds and thousands of feet lower than the upper one, and again in that respect in some of the fields there is great irregularity as to what depth the producing reservoir will be found; in neighboring wells the oil or gas may be tapped at entirely different depths. To any keen observer the above features at once indicate absolutely that the petroleum in all of their reservoirs are wanderers, not in their original home, and that all their deposits are deposits of secondary impregnation. This adventitious character of the petroleum in all their deposits is a self-evident proposition when the ever-present strong pressure of their natural gas is remembered. Fluids so elusive, ready to gush out with such force the moment the drill pierces their reservoirs, and evidently ever impelled upward through disturbed, faulted and fractured strata by the strong pressure of their gas, can never be in their original home, and the evidence that they are not is most abundant.

But there is another most important feature of the oil and gas fields, and that is they are generally very much elongated in one direction, and the different fields or pools of the same district are always arranged in lines along folded and fissured zones or belts parallel to the tectonic structure or to the orogenic uplifts of the region. The maps of the Appalachian oil and gas fields and of the Northwestern Ohio oil and gas fields published by the respective Geological Surveys of these

demonstrate that these fields form two parallel oil and gas belts to the Appalachian range of mountains, each belt being several hundred miles long. Many other illustrations of this may be found in the maps of the oil and gas districts of California, Galicia, Roumania, Russia and other oil regions. The oil and gas fields in these last-mentioned countries are always found ranged in belts at the foot and on each side, respectively, of the Coast range of the Carpathian Mountains and of the Caucasus Mountains. It is most marked in Galicia and Roumania, where the Carpathian Mountains form, as is well known, a semi-circle, and the oil and gas fields also States, illustrate this last feature most eloquently, and form the same semi-circle on both sides of the mountains and along their foothills or ranges. This reminds one of the metallogenetic provinces referred to and indicated by some geologists in regard to the incoming of particular metals into the strata at various periods of the earth's history in connection with certain volcanic manifestations and intrusions of that particular period, and along the great organic uplifts of that period. De Launay, Lindgren, Spurr and others have, in several of their writings, pointed out clearly some of these metallogenetic provinces. The alignment of the petroleum fields in every region in parallel belts to the orogenic uplifts or to the tectonic fissuring of that region shows conclusively that there are also in nature "petroliferous provinces" or petroleum-bearing belts no doubt due to causes similar to those which have given us the metallogenetic provinces, namely, tectonic disturbances accompanied by volcanic emanations. As De Launay remarks in his "Science of Geology,"<sup>1</sup> "the dislocations of the earth are more and more observed to have taken place, not alone in mountainous regions, but even in regions of plains"; he also remarks that<sup>2</sup> "all the regions of the earth, probably without exception, have been subjected to dynamic movements, to which are connected igneous manifestations of internal origin." These remarks will explain how petroleum fields even at long distances from mountainous ranges and in flat plains, such as the Northwestern Ohio, Ontario, Indiana, Illinois, Texas and Louisiana fields, etc., can nevertheless be connected with the tectonic structural dislocations of this continent and to the volcanic emanations which have accompanied these structural dislocations during the different geological ages. For further proofs of the connection of oil and gas fields with the disturbances of their region, even in the States which I mentioned last, where it is not at all apparent on the surface, I refer you to the following papers, one by G. D. Harris,<sup>3</sup> on the "Geological Occurrence of Rock Salt (associated with petroleum in Louisiana and Eastern Texas;" another by H. Foster Bain,<sup>4</sup> State Geologist of Illinois, on the "Geology of Illinois Petroleum fields;" to the records of the late Edward Orton,<sup>5</sup> on the "Northwestern Ohio Fields," and to one of my previous papers<sup>6</sup> before this Institute.

In the California oil fields a most obvious connection is to be seen in most of the fields, between the occurrence of oil and the very strong and profound disturbances of the strata occasioned by the orogenic uplifts of the hills and mountains of the Coast range. Con-

<sup>1</sup>La Science Geologique, L. De Launay, Paris, 1905, p. 229.

<sup>2</sup>La. Science Geologique, L. De Launay, Paris, 1905, p. 351.

<sup>3</sup>Economic Geology, Vol. IV, No. 1, Jan. and Feb., 1909, pp. 21-34.

<sup>4</sup>Economic Geology, Vol. III, No. 6, August-September, 1908, pp. 487.

<sup>5</sup>Geology of Ohio, Vol. VI.

<sup>6</sup>Journ. Can. Min. Inst., Vol. VI, pp. 102-108.



trary to many other oil fields, the oil is here often found in highly disturbed and intensely crushed strata, and in many cases along well defined and prominent structural faults. I refer you to Eldridge and Arnold's most interesting bulletin<sup>1</sup> on the Santa Clara Valley, Puente Hills and Los Angeles districts of Southern California for many good proofs and examples of this. Briefly, the evidence in this bulletin shows conclusively that the oil fields follow, in narrow but long belts, the much disturbed and faulted zones at the foot of the higher mountain ranges of the Coast Range, and that the oil is found to be stored in the porous reservoirs, rocks or in the seams and joints of any and all the strata affected by these disturbances in a vertical geological scale of some 25,000 feet, including at the bottom crystalline schists and gneisses resting on granite, then a great thickness of Tertiary resting unconformably on these crystalline schists, then an upper unconformable series, partly Tertiary and partly Quaternary, called the Fernando, and finally, overlapping all, unconformable beds of the Quaternary. To go into more details, the oil is found in the Santa Clara Valley in ascending order in the following formations:—

<sup>1</sup>U.S. Geol. Surv., Bulletin No. 309.

In the crystalline schist and gneiss penetrated by the walls to a depth of 1,100 feet; above this there is a great unconformity, but the oil is still found in the following strata in ascending order:—

Lower Eocene—Topatopa quartzites, sandstones and hard shales .....about 5,500 feet thick  
Upper Eocene—Sespe red sandstones and conglomerates .....about 3,500 feet thick  
Oligocene—Vaqueros shales, limestones and sandstones .....about 3,000 feet thick  
Miocene—Modalo sandstones and shales (probably equivalent to the Monterey formation) .....about 3,500 feet thick

Here there is another distinct unconformity, but above it we still find oil in the

Miocene, Pliocene and Pleistocene—Fernando conglomerates, sandstones and arenaceous clays .....about 9,000 feet thick

Here again is another distinct unconformity, but above it we again find the oil in

Pleistocene gravel, sandstones, clays and conglomerates of variable thicknesses.

*To be continued.*

## COINAGE IN THE BRITISH EMPIRE.

(Written for the Canadian Mining Journal by J. J. Harpell.)

In the matter of coinage as in that of credit the United Kingdom, more particularly London, may rightly be regarded as the money market of the world. According to the last official returns her imports and exports of gold and silver coin and bullion for the year 1907 were as follows:

|                               | Imports.      | Exports.      |
|-------------------------------|---------------|---------------|
| British gold and silver coin. | \$41,306,000  | \$97,813,000  |
| Foreign gold and silver coin  | 64,231,000    | 41,500,000    |
| Gold and silver bullion.....  | 247,870,000   | 198,454,000   |
| Total .....                   | \$353,407,000 | \$337,767,000 |

In addition the imports of gold and silver in the ore amounted to \$15,287,000, and the exports of the same to \$100,000. The imports of gold leaf were \$597,000, of which \$5,000 was exported. From these figures it will be seen that, neglecting the amount which may have gone out of or come into the country in the shape of manufactured articles made entirely or partly of gold and silver, the United Kingdom imported some \$40,000,000 worth of these precious metals more than she exported in the year 1907.

Incidentally these figures furnish substantial proof that the mother country is not being drained of her gold and silver as some people would have us believe, who point to the very great excess of total imports of raw materials, food stuffs and manufactured goods over total exports, which excess in the same year, viz., 1907, amounted to \$640,000,000. Evidently the many ways in which this excess may be liquidated, such as by the interest on foreign investments, the earnings of the British merchant marine and the profits from international banking, insurance and other business, are more than sufficient.

Another feature of the figures given above which deserves special notice in passing is the large imports

and exports of coins of foreign countries. This is a fair indication of the cosmopolitan character of Britain's intercourse with the world both industrial and otherwise.

But the feature of the above figures that is more pertinent to the subject of this article is that much of the precious metals comes into the United Kingdom in the form of bullion and goes out in the form of British coin, in which form the greater part of that remaining in the country is also to be found. And it is with the British minting system that I desire to deal more particularly. The figures given above pertain only to the United Kingdom. But in dealing with the manufacture of coin a general reference will be made to minting in the colonies and dependencies as well as a more or less full account of the operations as they are carried on at the Royal Mint in London; because the mints of the Empire form one great system, those in the colonies being more or less branches of the Royal Mint in London.

The world's production of gold in 1907 was \$414,700,000. Of this the British Empire produced \$247,350,000. During the same year the gold turned into coin by all the mints of the world amounted to \$369,170,000, as follows:

|                           |               |
|---------------------------|---------------|
| British Empire .....      | \$152,384,000 |
| United States .....       | 80,452,000    |
| France .....              | 75,652,000    |
| Germany .....             | 16,227,000    |
| All other countries ..... | 44,355,000    |

The world's production of silver in the same year was \$239,775,000, of which the British Empire produced \$38,141,000. In the same year the value of silver turned into coins was \$207,902,000, as follows:



|                           |               |
|---------------------------|---------------|
| British Empire .....      | \$101,835,000 |
| United States .....       | 13,110,000    |
| France .....              | 16,017,000    |
| Germany .....             | 20,922,000    |
| All other countries ..... | 56,018,000    |

In addition to gold and silver coins, the British Mints turned out \$2,676,848 nickel coins, \$271,265,647 copper coins, \$8,202,599 aluminium coins, together with a number of official seals and medals.

The above figures include the re-coinage of worn and mutilated coins withdrawn from circulation, which, however, is small as compared with the coinage from bullion.

The parent Mint of the British Empire is the Royal Mint of Tower Hill, London. Previous to 1810 it was housed in the Tower of London, where it had been as far back as history records. Formerly mints were numerous in England, there being as many as fifty in the reign of Edward the Confessor. In the reign of Stephen, when the right was granted to barons and ecclesiastics to mint for private profit, they became even more numerous. But their number from that period on diminished, until the right of coining in the United Kingdom was confined to the one mint, namely, the Royal Mint of London. There is another mint, however, at Birmingham, known as the Birmingham Mint, Limited, where coins are occasionally made under the supervision of the Royal Mint.

Branches of the Royal Mint have been established in a number of colonies as follows: Three in Australia, namely, at Sydney, Melbourne and Perth; two in India, namely, at Calcutta and Bombay, and one in Canada, at Ottawa.

Nominally and technically, in as much as the technical skill for each of these branches is supplied by the parent mint in London, these are branches of the Royal Mint. But in many respects they are completely under the control of the Government of the colony in which they are situated. Any profit accruing from their operation goes to the Government of the colony, which also bears any loss. Moreover, the bullion required is purchased by the government of the colony under whose jurisdiction the mint is operated.

The nominal head or master of the Royal Mint is the Chancellor of the Exchequer. The administrative head is the Deputy Master and Comptroller, who has under him—

- (1) A chief clerk, who is responsible for the receipt of bullion and the delivery of the coin.
- (2) A superintendent, whose business it is to look after the manufacture of coin.
- (3) An assayer, whose duty it is to value the bullion and determine the fineness of the coin.

In each of these departments, of course, there are many assistants and workers.

In connection with most mints, including many of those in the British colonies, there are refineries for refining the metal. But some years ago the Royal Mint, finding it more convenient and less troublesome to accept nothing but refined metal, leased its refinery to the Rothchilds, who now do about two-thirds of the gold refining in England. The balance is done by three or four other refineries, all conducted as private enterprises.

The Royal Mint is required, by Act of Parliament, to coin, free of charge, any refined gold offered it, and to deliver to him who brings such gold, sovereigns and half sovereigns at the rate of £3 17s. 10½d. per stand-

ard ounce troy, without any deduction for waste or seigniorage or charge for alloy or expense of manufacture. But the trouble and the time required for minting has shown those who have gold to coin that it is less troublesome and more profitable for them to take their bullion to the Bank of England, where they will receive sovereigns and half sovereigns at the rate of £3 17s. 9d. per ounce troy—the one and one-half pence being profit to the bank. The result is that almost all the gold coined at the mint is presented by the Bank of England. The bank, it may be explained, may suffer no loss of interest by the time required for coinage, because bank notes may have already been issued against it. However, this is generally not true, because for years the gold reserves of the Bank of England have exceeded its note issue. Thus from a point of loss or gain it makes no difference to the bank whether the gold is lying in its vaults in the form of bullion or going through the Royal Mint in the process of being made into coins. Refined gold bullion is generally in the form of bars, each weighing about 400 ounces. Standard gold is 916.6 fine.

Just here it may be of interest to refer to the manner in which the Bank of England receives and retains its gold. By the provisions of the British Banking Act, any one is entitled to demand notes from the Bank of England for standard gold, at the rate of £3 17s. 9d. per ounce. That is, the bank is forced to buy at a fixed price all the gold offered to it. Hence any gold offered in the open market, which is not bought at a premium by private interests or foreign banks, is turned over to the Bank of England. This provision has brought about two results. It has made London the gold market of the world, and it has made it impossible for the price of gold to fall below the price specified. On the other hand, any one possessing Bank of England notes may demand their equivalent from the bank, and foreign banks or financial houses desiring gold may procure Bank of England notes in exchange for securities, and then procure gold from the bank by presenting these notes for redemption. This privilege often leads to large and sudden demands upon the gold reserves of the bank, particularly in times of financial trouble in other countries, or when the balance of trade against the United Kingdom becomes so great that bills drawn upon her banks and business houses sell in foreign markets at discounts large enough to permit gold to be imported into these foreign countries at a profit. The only way the Bank of England can check such demands is by increasing her rate of discount. In other countries, such as France and Germany, the outflow of gold is generally checked by offering a premium for gold when it is likely to be exported. In other words, London is a free gold market, which fact has contributed not a little to making it the money market of the world.

Silver and bronze (the metal from which our "coppers" and pennies are made) are not received by the Royal Mint in the same way as gold. Silver bullion and the copper, tin, and zinc required to make bronze coins, are bought by the mint in open market, manufactured into coins, and kept in stock to be issued as required. From the manufacture of these coins there is a considerable profit to the Mint. With silver at its present price, there is over 100 per cent. profit in the manufacture of silver into coin. It is the duty of the Royal Mint to receive at their face value for recoinage all worn gold and silver coins that are withdrawn from circulation by the banks when they are found to be below the standard weight. In spite of the loss in this



recoinage, however, the profit from the manufacture of silver and bronze coins is so great that for years there has been a substantial net surplus, after paying all expenses and making good any loss on worn coins.

In 1907 the profits of the Royal Mint accruing from the coinage of silver and bronze amounted to about \$5,000,000. The total outlay for salaries and other expenses was about \$400,000. The loss on recoinage of gold was \$40,000, while on the recoinage of silver it was \$280,000. Thus on the whole the Royal Mint showed a net profit to the United Kingdom of considerably over \$4,000,000. The methods employed in the manufacture of gold and silver coins at the Royal Mint are as follows:

The gold is melted in graphite crucibles about ten inches in height and eight and one-half inches in diameter at the widest part. The charge is from 1,200 to 1,300 ounces of metal. The crucible is put into a furnace first and allowed to get red hot before the gold is put in, the copper being added last and a lid put on the crucible to check the loss by volatilization. The charge is completely melted in about one-half an hour, and it is then thoroughly mixed by stirring with a graphite rod. The crucible is lifted out and the contents poured into moulds. The molten gold which is of a pale green color, solidifies at once in the iron moulds, and the bars are taken out immediately. They are then trimmed, assayed, and rolled. The amount of gold smelted in an ordinary day's work at the Royal Mint is from two to two and one-half tons. Silver is

melted in a similar way, except that larger crucibles are used. These rough bars are then passed backwards and forwards between steel rollers until they are reduced to the required thickness. They are then examined by a "Tryer," who cuts out one or two blank discs from each fillet and weighs them. If the weight of the blank is slightly below the standard weight, a somewhat larger cutter is used so that the blank may be of the correct weight. If the blank is too heavy, the fillet is passed through the roller again. When the fillets are reduced to the correct thickness they are sent to the cutting room, where as many discs as the fillets will produce are cut out, and the "scissel" or waste part of the fillets is sent back to the melting-house. The discs are then sent on to the marking-room, where their edges are rolled to produce a raised rim or to impress a design on the edge. The discs are then submitted to an "annealing" or softening process, so that they may be more easily stamped. After softening they are sent to the stamping-room, where each is struck between dies surrounded by a collar, which leave the required impression on the surfaces of the coin. From the stamping-room they go into the weighing-room. Here the coins of the required standard weight are selected and packed up ready for circulation, while all those that are found to be either under or over the standard weight are sent back to the melting-room. Of course, all these processes are done by automatic machines of the latest and most improved designs.

## EXAMINATIONS UNDER THE COAL MINES ACT, PROVINCE OF ALBERTA.

**Fire Boss Examination. December 9th and 10th, 1908**

**Paper No. 1. Time Allowed, Two Hours.**

The value attached to each question is given in brackets. Candidates must obtain 60 per cent. of the allotted marks to pass.

### **Coal Mines Act.**

1. State fully the various provisions of General Rule 8, relating to the use of explosives below ground. (25)
2. What are the regulations governing the employment of boys below ground? (15)
3. What are the requirements of the Act regarding the supply of timber to be kept at the mine? (15)
4. What are the requirements of the Act regarding signals and manholes on planes worked by machinery? (15)
5. What does the Act say regarding fences? (15)
6. State fully the provisions of the Act as to withdrawal of workmen in case of danger. (15)

### **COAL MINES ACT, PROVINCE OF ALBERTA.**

**Fire Boss Examination. December 9th and 10th, 1908**

**Paper No. 2. Time Allowed, Two Hours.**

The value attached to each question is given in brackets. Candidates must obtain 60 per cent. of the allotted marks to pass.

### **Ventilation.**

1. What gases are found in mines, and how would you tell one gas from another? Describe each gas carefully and fully. (20)

2. Describe and give the use of each of the following instruments in coal mining: Barometer, Anemometer, Thermometer and Hygrometer. (15)

3. What is meant by "Diffusion of Gases" and what effect has this on mine ventilation? (15)

4. Explain all the accidents or causes which may make a safety lamp dangerous in the mine. Who discovered the principle of the safety lamp and what did this discovery consist of. (15)

5. What are the different methods of producing ventilation in a mine? State the different ways of ventilating the face of development work which is in advance of the air current. (15)

6. Ventilate the given plan, showing direction of air currents and marking on all stoppings, doors, air crossings, etc. (20)

### **COAL MINES ACT, PROVINCE OF ALBERTA.**

**Fire Boss Examination. December 9th and 10th, 1908**

**Paper No. 3. Time Allowed, Two Hours.**

The value attached to each question is given in brackets. Candidates must obtain 50 per cent. of the allotted marks to pass.

### **Practical Work.**

1. Give a full account of all your experience in coal mining. (20)
2. Sketch and describe a mine or part of a mine with which you are acquainted. (20)
3. Describe with sketch how you would timber a main gangway in a 6-foot seam of coal, pitch of seam



35 degrees, gangway to be 9 feet wide and 6 feet in height from low side rail. (20)

4. An incline with a 30 degree pitch runs at right angles to a main entry. Sketch and describe how you would lay steel track at bottom of incline to connect with main entry track. Double track on main entry up to foot of incline, single track beyond, with single track up incline except for short distance at foot of incline. (20)

5. Describe in detail all the various methods of shot lighting as permitted in gaseous and non-gaseous mines. (20)

#### COAL MINES ACT, PROVINCE OF ALBERTA.

**Fire Boss Examination. December 9th and 10th, 1908**  
**Paper No. 4. Time Allowed, One Hour.**

The value attached to each question is given in brackets. Candidates must obtain 50 per cent. of the allotted marks to pass.

##### Arithmetic.

1. Multiply four thousand nine hundred and eighty by thirty-four thousand seven hundred and eighty-two. (20)

2. Add the following numbers together: 642, 4812, 27, 34986, 347, 928, 63471, 62. (20)

3. Divide 68754 by 374. (20)

4. From 7896432 subtract 6797228. (20)

5. How many cubic feet of air would you require to produce in a mine where 200 men were employed, supposing each man required 200 cubic feet of air per minute and there was a leakage of 15,000 cubic feet between the intake and return airway before the air reached working faces? (20)

#### COAL MINES ACT, PROVINCE OF ALBERTA.

**Pit Boss Examination. December 9th and 10th, 1908**  
**Paper No. 1. Time Allowed, 1½ Hours**

The value attached to each question is given in brackets. Candidates must obtain 60 per cent. of the allotted marks to pass.

##### Coal Mines Act.

1. State fully the provisions of General Rule 8, relating to the use of explosives below ground. (25)

2. State fully the provisions of the Act regarding the use of safety lamps. (20)

3. What are the requirements of the Act regarding manholes? (20)

4. What are the regulations governing the employment of boys about hoisting machinery? (15)

5. What does the Act say regarding the employment of females and boys in or about the workings of a mine? (20)

#### COAL MINES ACT, PROVINCE OF ALBERTA.

**Pit Boss Examination. December 9th and 10th, 1908**  
**Paper No. 2. Time Allowed, 2½ Hours.**

The value attached to each question is given in brackets. Candidates must obtain 60 per cent. of the allotted marks to pass.

##### Ventilation.

1. Name the various occluded gases. Give their specific gravity and describe their various properties. (20)

2. Describe what you consider to be a good lamp for testing for gas. Why is it important that smaller

quantities should be detected than can be found with an ordinary safety lamp? (15)

3. An anemometer gives a reading of 24,000 cubic feet per minute in an airway 10 feet wide and 6 feet high while the water gauge reads 1.6 inches. What is the useful horsepower in the air? (15)

4. What pressure and power are expended in passing 20,000 cubic feet of air through an airway 8 feet by 10 feet and 6,000 feet long? (15)

5. Sketch and describe the water gauge. It is said that 1 inch of water gauge shows a ventilating pressure of 5.2 lbs. per square foot. How is this value determined? (15)

6. Ventilate the given plan, showing direction of air currents and marking on all stoppings, doors, air crossings, etc. (20)

#### COAL MINES ACT, PROVINCE OF ALBERTA.

**Pit Boss Examination. December 9th and 10th, 1908**  
**Paper No. 3. Time Allowed, Three Hours.**

The value attached to each question is given in brackets. Candidates must obtain 50 per cent. of the allotted marks to pass.

##### Practical Work.

1. Sketch and describe the arrangements necessary at the top of a shaft to ensure safety while sinking. (15)

2. Sketch and describe how you would work a 7-foot seam of bituminous coal lying on a 28 degree pitch with a hard rock roof and floor. (20)

3. Sketch and describe how you would work a 7-foot seam of lignite coal, the seam lying flat and having a soft clay roof and floor. (20)

4. How do you draw timber in a mine and what appliances are necessary?

5. State the conditions that would guide you in determining the size of pillars to be left in room and pillar working. (15)

6. What methods would you adopt for supplying timber to the working face when the rooms have been driven a considerable distance up from the levels, the pitch of the seam being 45 degrees. (15)

#### COAL MINES ACT, PROVINCE OF ALBERTA.

**Pit Boss Examination. December 9th and 10th, 1908**  
**Paper No. 4. Time Allowed, Three Hours.**

The value attached to each question is given in brackets. Candidates must obtain 50 per cent. of the allotted marks to pass.

##### Machinery.

1. What useful horsepower is expended in raising 10 tons to a height of 165 feet in half a minute? (15)

2. What is the horsepower of an engine with a 30-inch stroke, 15-inch cylinder and an average steam pressure of 60 lbs. per square inch, running at 40 revolutions per minute? (20)

3. What are the various appliances required by the Coal Mines Act in connection with the machinery and other plant at a mine? (20)

4. Calculate the size of steel rope required for a breaking strain of 100 tons. (15)

5. Give sketches showing various forms of rope capping. Say which form you prefer and why. (15)

6. Sketch and describe a good form of brake for a haulage engine. (15)



**COAL MINES ACT, PROVINCE OF ALBERTA.**

**Pit Boss Examination. December 9th and 10th, 1908**  
**Paper No. 5. Time Allowed, Three Hours.**

The value attached to each question is given in brackets. Candidates must obtain 50 per cent. of the allotted marks to pass.

**Surveying.**

1. What experience and what amount of study have you had in connection with mine surveying? (15)
2. Describe briefly the instruments, etc., required for making a mine plan. (15)
3. How many tons of coal are there in 1 7-8 acres of a flat seam 6 feet in thickness? Take the specific gravity of the coal to be 1.30. (20)
4. Describe by what method you find the difference in level between the ends of a main gangway and also between the top and bottom of a steep slope or incline. (15)
5. Plot the following survey:
 

|          |                   |
|----------|-------------------|
| Bearing. | Distance in feet. |
| N. 47 E. | 88                |
| N. 3 W.  | 165               |
| S. 41 W. | 114               |
| N. 89 W. | 39                |

 (20)
6. Draw to scale a vertical 12-foot pulley wheel for 1½-inch rope suitable for a pit-head frame. Show the wheel in side and end elevation and also show a cross section of the wheel. (15)

**COAL MINES ACT, PROVINCE OF ALBERTA.**

**Mine Managers Examination. Dec. 9th and 10th, 1908**  
**Paper No. 1. Time Allowed, 1½ Hours.**

The value attached to each question is given in brackets. Candidates must obtain 70 per cent. of the allotted marks to pass.

**Coal Mines Act.**

1. State fully the various provisions of General Rule 8 relating to the use of explosives below ground. (25)
2. State fully the provisions of the Act regarding the use of safety lamps. (20)
3. Summarize the chief provisions of the Act to amend the Coal Mines Act for the purpose of limiting hours for work below ground, commonly called the "Eight Hours Law." When does this Act come into force? (20)
4. What are the requirements of the Act regarding machinery used in or about the mine? (10)
5. What returns and notices have to be sent to the Minister of Public Works and what returns and notices have to be sent to the Inspector of Mines under the Act? (25)

**COAL MINES ACT, PROVINCE OF ALBERTA.**

**Mine Managers Examination. Dec. 9th and 10th, 1908**  
**Paper No. 2. Time Allowed, 2½ Hours...**

The value attached to each question is given in brackets. Candidates must obtain 70 per cent. of the allotted marks to pass.

**Ventilation.**

1. What is the weight of a cubic foot of air at a temperature of 30 degrees centigrade, when the barometer reads 29 inches? (15)
2. As a mine manager, taking in charge the direction of operations at a large gaseous mine, how would you examine it to satisfy yourself that it was being worked safely and according to law? (15)

3. State your views as to causes of explosions in mines and what precautions you would adopt to prevent them. (15)

4. Show by calculations which of the following airways will pass the most air, power and length being the same in each case:

- |                     |                    |
|---------------------|--------------------|
| 1—One airway        | 10 feet by 10 feet |
| 2—One airway        | 5 feet by 20 feet  |
| 3—Two airways, each | 5 feet by 10 feet  |

5. Explain with diagrams the difference in construction of a force fan and an exhaust fan. With reference to force and exhaust fans, what style of fan is best suited in Alberta, bearing in mind climatic conditions? (15)

6. What are the advantages of splitting the air current? What determines the limit at which splitting should stop? (10)

7. Ventilate the given plan, showing direction of air currents and marking on all stoppings, doors, air crossings, etc. (15)

**COAL MINES ACT, PROVINCE OF ALBERTA.**

**Mine Managers Examination. Dec. 9th and 10th, 1908**  
**Paper No. 3. Time Allowed, Three Hours.**

The value attached to each question is given in brackets. Candidates must obtain 60 per cent. of the allotted marks to pass.

**Practical Work.**

1. What are "bumps" as they occur in the mines of the Crow's Nest Pass? What are the causes and results of these occurrences and what remedy do you suggest for their prevention? (15)
2. What are the advantages of electric blasting? Describe the construction of the high tension and also the low tension detonator. How are detonators tested before use? (15)
3. Explain with sketches the different systems of drawing pillars which can be applied in the bituminous and lignite mines in Alberta. (15)
4. Classify the accidents liable to occur in lignite and bituminous mines and point out what remedies and precautions you propose to lessen these accidents. (15)
5. Describe with sketches the two main methods of mining coal. Give the conditions favorable to or requiring the application of each of these methods. (15)
6. To what use is electricity put in coal mines and what dangers arise from its use in mines? (10)
7. How would you proceed to replace a set of broken timbers in a main haulage road? Explain fully, going into details and taking into account the different conditions of roof, sides and floor. (15)

**COAL MINES ACT, PROVINCE OF ALBERTA.**

**Mine Managers Examination. Dec. 9th and 10th, 1908**  
**Paper No. 4. Time Allowed, Three Hours.**

The value attached to each question is given in brackets. Candidates must obtain 60 per cent. of the allotted marks to pass.

**Machinery.**

1. Compare the advantages and disadvantages of power transmission into mines by means of compressed air, steam and electricity. (15)
2. How far would you place a pump above the water for it to work satisfactorily? State fully how you arrive at your answer. (10)
3. What is the pressure per square inch on the plunger of a pump raising water up a slope 300 yards long with a 33 1-3 per cent. grade? Neglecting fric-



tion, find the mean effective steam pressure required for this pump if the steam cylinder is 8 inches in diameter and the water cylinder 4 inches in diameter. (15)

4. What is there in water that produces incrustation in boilers? How do you proceed to clean a boiler? (15)

5. How far must a weight of 80 pounds be placed from the fulcrum of a safety valve having a diameter of 3 inches, the valve stem being 4 inches from fulcrum; the valve to blow off at 75 pounds pressure? (15)

6. What size of rope is necessary for a 400 foot shaft, hoisting with double decked cages, one car containing 25 cwt. on each deck? What are the various causes of wear on hoisting ropes? At which points does a hoisting rope wear most? What precautions would you take to ensure safety in the use of hoisting ropes? (15)

7. Find the H. P. of a duplex engine with 30-inch cylinders, 5-foot stroke, 40 revolutions per minute, with an average piston pressure of 40 pounds per square inch and an average back pressure of 5 pounds per square inch. (15)

### COAL MINES ACT, PROVINCE OF ALBERTA.

Mine Managers Examination. Dec. 9th and 10th, 1908

Paper No. 5. Time Allowed, Three Hours.

The value attached to each question is given in brackets. Candidates must obtain 60 per cent. of the allotted marks to pass.

#### Surveying.

1. What is meant by declination and variation when speaking of the compass? (15)

2. How many tons of coal are there underlying a square field containing 8 acres, the seam being 6 feet 6 inches thick, lying at an angle of 31 degrees, the specific gravity of the coal being 1.51. (20)

3. Plot the following compass survey to a scale of 100 feet to 1 inch:

| Station. | Bearing.  | Distance in feet. |
|----------|-----------|-------------------|
| 1-2      | N. 32½ E. | 255               |
| 2-3      | N. 79 E.  | 134               |
| 3-4      | S. 61 E.  | 160               |
| 4-5      | S. 28¼ E. | 325 (20)          |

4. Two drill holes A. and B. 1000 yards apart, are put down to a coal seam. The depth of hole A. is 506 feet, the depth of hole B. is 766 feet. The surface at A. is 30 feet above the surface at B. Give the inclination of the seam, calculated in feet per hundred feet. (15)

5. On a mine plan there is shown a horizontal distance of 100 feet, and also a vertical distance of 100 feet. What is the distance measured on the pitch and what is the average pitch of the seam? (15)

6. How are the surface and underground surveys of a mine connected when the mine is operated by means of a shaft? (15)

### FLUXES FOR SILVER TAILINGS.

In electro-plating with silver, and in other technical processes in the industrial arts, there are large quantities of silver tailings and precipitates, for the proper recovering and utilization of which smelting is necessary. These by-products are of such different characters that if they were all melted together, there would result no pure material, but the mass would ball together in the crucible and form a half-melted lava-like material, in which, as far as industrial purposes

are concerned, the silver would be in a worse condition than before. In order to smelt such a mass and get therefrom a pure silver bar, there must be used a flux, for the purpose of setting free the oxide that has been formed, and permitting the metal to form a single mass.

The flux described below by a writer in the "Deutsche Metall Industrie Zeitung" has been used for a long time in establishments that smelt silver tailings and sweepings, and has given the highest satisfaction. Originally it was used in the cyanide process for the extraction of gold from auriferous ores.

This process consists essentially in grinding the ore fine and then leaching the resulting material in wooden tubs by a weak solution of potassium cyanide. The latter substance dissolves out the gold and silver in the ore; the clear solution is drawn off, and the noble metals precipitated by the addition of zinc scrap. The deposit thus formed consists of gold, silver, copper and a greater or less quantity of zinc. When dried, it is smelted with a flux, and the mass sent to the refinery.

As this flux has given good satisfaction in the process just named, experiments were made to determine whether or not it could be employed to advantage for other kinds of silver-smelting, and for other sweepings, etc., containing silver or gold. Favorable results were obtained therewith. The flux consists of 3.06 kg. of calcined soda (soda ash), 0.9 kg. of borax glass, 0.4 kg. of sand, 126 grams of fluorspar. Borax glass is to be used, not borax itself, as the latter, when heated, swells too much, and this makes trouble in smelting the silver-bearing or gold-bearing materials. Borax glass can be obtained by melting crystallized borax and sand in a graphite crucible, until all is clear, and then pouring the liquid. Any kind of sand may be used, only it must not be coarse.

The silver-bearing material is mixed with the flux, and the mixture melted in a graphite crucible. This latter must not be quite full, as the mass swells a great deal in melting. The amount of flux necessary depends on the kind of material being melted. For most such material, the flux is employed in the proportion of one thereof to two parts of the former.

Where the tailings or sweepings are all chlorides, more flux—even equal parts by weight—is necessary. Fluorspar is added to make the resulting mass more liquid. In a slag of thick consistence, such as is produced by soda-ash alone, the metal does not separate, but attaches itself to the slag, so that much thereof remains on the latter. Where, however, fluorspar is used, the slag is rendered so liquid that all the metal, once melted, falls at once to the bottom of the crucible.

Where there is much iron in the material to be smelted it must be removed by the aid of magnets. As iron has a very unfavorable effect on the process of smelting, it must in no case be allowed to remain in the material. Incidentally, this latter must be perfectly dry before being mixed with the flux. R. G.

Coals carrying as high as 5 per cent. of sulphur can be burned without particular danger from clinkers. A little steam introduced under the grate will relieve much of the trouble. Of course clinker may be due to other causes than sulphur, as any constituents of the ash that are readily fusible may produce it.

Bituminous coals lose about 35.05 per cent. of their sulphur during coking.



### MEETING OF THE COBALT BRANCH OF THE C. M. I.

The annual meeting of the Cobalt Branch of the Canadian Mining Institute was held on April 23rd. The President of the Institute, Dr. W. G. Miller, was present on special invitation.

The business of the evening was to appoint officers for the coming year. Retiring Chairman A. A. Cole was succeeded by Mr. R. W. Brigstocke. Mr. Cole was appointed secretary-treasurer, and an Executive Committee was elected comprising Messrs. Fraleck, Logan, Davis, Culbert and Bryce. The selection appears to be particularly fortunate. All of the members of the committee are active and prominent citizens of Cobalt. Mr. Fraleck is the well-known manager of the Cobalt Lake Mining Company; Mr. Logan, the local manager of the Canadian Bank of Commerce, is the leading banking man of the town; Mr. Davis is managing director of the Pontiac Mining Company and has for some years been an outstanding figure in Cobalt affairs; Mr. Culbert is manager of the O'Brien Mine; and Mr. Bryce is manager of the Cobalt Consolidated.

After the business of the evening had been transacted, Mr. Fraleck gave a talk on the outlook for mining in Ontario during 1909. Mr. Cole then read a paper which will appear in the Journal of the Canadian Mining Institute, entitled, "Sampling La Rose Mine."

On Monday, 26th April, a meeting of the Executive Committee was held. Messrs. Cole and Davis were appointed curators of the library and mineral collections. It was resolved that the committee would ask the leading mining companies for contributions towards fitting up the rooms.

It has been decided that the rooms of the Cobalt Branch will be fitted up with mineral show cases, maps, books, official reports, etc. The object is to make these rooms an accessible bureau of information for the general public, so that not only members, but also responsible outsiders, may avail themselves of the facilities there afforded.

The intention of the Branch is to have monthly meetings. The membership now numbers nearly 100, and there is every evidence of activity and interest.

The thanks of the Branch are due to Mayor H. H. Lang for his kindness in securing rooms.

### PURCHASING COAL UNDER SPECIFICATIONS.

In the year 1907 the U. S. Geological Survey was instructed to begin the testing of coal for government use. A uniform standard of specifications has now been adopted by all departments of the U. S. Government.

The advantages of this system are thus summed up:—

1. Bidders are placed on a strictly competitive basis as regards quality, as well as price. This simplifies the selection of the most desirable bid, and minimizes controversy and criticism in making awards.

2. The field for both Government and dealers is broadened, as trade names are ignored and comparatively unknown coals offered by responsible bidders may be accepted without detriment to the Government.

3. The Government is insured against the delivery of poor and dirty coal, and is saved from disputes arising from condemnation based on the usual visual inspection.

4. Experience with the old form of government control shows that it is not always expedient to reject poor coal, because of the difficulty, delay, and cost of removal. Under the present system rejectable coal may be accepted at a greatly reduced price.

5. A definite basis for the cancellation of contract is provided.

6. The constant inspection and analysis of the coal delivered furnishes a check on the practical results obtained in burning the coal.

### RHODESIAN GOLD MINES.

Records for the year 1907 show thirty operating gold mining companies in Rhodesia. A few details concerning one or two will show the character and scale of these enterprises.

The Giant Mines of Rhodesia, Limited, owns 90 claims in the Gadzema district of Mashonaland, 65 miles west of Salisbury and three-quarters of a mile from railway. The authorized capital is £250,000, in 250,000 shares of £1 each. All the shares are issued and fully paid. A 15-stamp mill, three tube mills and slimes plant have been in operation since December, 1905. During 1906-7, 53,897 tons of ore yielded £106,899 in gold, or 39s. 8 d. per ton. Dividends have been paid since 1905.

The Globe and Phoenix Gold Mining Co., Limited, owns 79 claims in the Sebakwe district, Matabeleland. The company has an authorized capital of £200,000, in 200,000 shares of £1 each, all of which are issued and fully paid. The equipment consists of a 40-stamp mill, a cyanide plant, and a slimes plant. During 1907 77,950 tons crushed yielded 39,791 oz. gold. At June 30th, 1907, ore reserves stood at 109,706 tons, averaging 11 dwts. per ton. Substantial dividends have been paid since 1900, with the exception of the year 1903.

The Gaika Gold Mining Company, Limited, holds 131 claims in the Sebakwe district. Its authorized capital is £300,000, in shares of £1; 205,007 shares are issued and fully paid; 168,000 vendors' shares were credited as fully paid. There are £50,000 six per cent. debentures. The equipment comprises a 5-stamp mill, a Huntingdon, and a Chilean mill. The gold output for 1907 was 10,890 ounces. At June 30th, 1907, ore reserves stood at 20,000 tons, carrying 13.5 dwts. per ton, and 32,670 tons of lower grade.

For the above figures we are indebted to Skinner's "Mining Manual."

### COLORADO COAL.

There were 14,523 men employed in the coal mines of Colorado in 1908. The average number of days worked by each man was 212, as compared with 258 days in 1907. The average production per man was 663 tons in 1908. In 1907 the average was 759. The average production per day per man was 3.13 tons in 1908, as compared with 2.94 tons in 1907. A majority of the mines held to the ten-hour day. The total quantity of coal produced was 9,634,973 short tons, having a spot value of \$13,586,988, a decrease of 10.71 per cent. in quantity and of 9.90 per cent. in value as compared with the previous year. 211 mining machines were used, producing 1,668,602 tons. Altogether 449,320 tons of raw coal were washed, yielding 336,123 of cleaned coal. All of this was used for coking. 61 men were killed and 115 injured. By far the larger number of deaths and injuries resulted from falls of roof in rooms.



## EXCHANGES.

**The Colliery Guardian, April 23, 1909.**—The Mining Department of the University of Birmingham is the subject of an article in this issue. In connection with the mining branch of this institution there is a well-equipped experimental mine. Here students are instructed in mining, ventilation, the use of explosives, rescue work, and mine surveying. The instruction offered in rescue work is particularly important. This, we believe, is the first instance of a university affording such facilities.

**The Mining Journal, April 17, 1909.**—The Royal Commission on Mines has recently issued an interim report detailing the results of an enquiry into the ventilation of collieries. "Statistics show," says the Mining Journal, "that the control exercised is more effective in the case of mines under the Coal Acts than under the Metalliferous Mines Acts, which makes us greatly regret that more attention has not been given in the proceedings of the Commission to the latter class of workings."

**Mining and Scientific Press, April 24, 1909.**—A correspondent discussing Dr. Kemp's definition of an ore suggests some modifications. As limiting the commercial phase of Dr. Kemp's definition, he cites the case of a pile of magnetite purchased at a bankrupt sale. "In a scientific sense an 'ore' is a metalliferous mineral belonging to the group of those that have commercially yielded the metals to the world's wealth. In its technical sense an 'ore' is a metalliferous mineral or an aggregate of metalliferous minerals, more or less mixed with gangue, and capable of being won as a commercial operation, adding in any way to the world's wealth." The last phrase is hardly clear enough, but it touches nearer the truth than anything we have seen.

**The South African Mining Journal, March 27, 1909.**—Public opinion on this side of the globe does not enforce upon mining companies the regular publication of monthly or even quarterly reports. The South African Mining Journal contrasts this state of affairs with that obtaining on the Rand, where every company files a return each month with the Transvaal Chamber of Mines. These are broadcast. The returns give full particulars of the month's work. Moreover, most mines cable summarized returns to London each month. Further information is given in quarterly reports, and in the event of any very important discovery being made, reserve shares being disposed of, or any large additions to plant being agreed on, interim reports are invariably issued both in Johannesburg and London. These various channels of information, along with the annual reports and speeches and discussions at the annual meeting, leave little to be desired.

**The Iron and Coal Trades Review, April 23, 1909.**—Under the heading, "What Percentage of Firedamp is Dangerous?" the Review discusses Dr. Cadman's report on this vital point. Dr. Cadman's conclusions are that less than 1 per cent. can be discovered by a careful observer on the flame of any safety lamp burning pure colza, by the aid of a magnifying glass; that 2 per cent.

of firedamp gives a complete cap a quarter of an inch high; and that when the return air from a stall, panel, or district contains 2 per cent. of gas, the mine is dangerous and the men ought to be withdrawn. It was shown that firemen and deputies have almost universally been in the habit of testing for firedamp without entirely obliterating the white light of their wick flames, and consequently percentages of 3 and 3½ have been the smallest discovered. Of 41 firemen examined it was found that 21 either had no nystagmus or were very slightly affected, seven were slightly affected, six were distinctly affected, and seven were severely affected.

**The Engineering and Mining Journal, May 1st, 1909.**—In an interesting article on Gow Ganda, Mr. H. E. West concludes that in the Miller Lake and Gow Ganda districts are many favorable prospects that promise to become mines. "At the same time it is certain that not one of these embryonic mines can become a steady producer of silver without the assistance of the railroad. It would, therefore, seem to be the duty of the Government to provide the means whereby these latent assets can be quickened into life, and increase the silver production of Ontario.

Mr. West indicates that, whilst it is within the realm of possibility that the whole Montreal River section may, within five years, equal the present production of Cobalt, this must be based upon the two assumptions that railroad construction is commenced forthwith and that the development of the mines at depth prove not less favorable than at the surface.

These assumptions, we suggest, should have been reversed in order.

### PERSONAL AND GENERAL.

Mr. D. H. Browne, chief metallurgist to the Canadian Copper Company, was in Toronto on April 29th.

Mr. John B. Hobson has returned to Victoria, B.C., after having spent the winter in California. He will shortly leave for Cariboo.

Mr. Benj. B. Lawrence, consulting engineer for the Kerr Lake Mining Co., Cobalt, Ont., has returned to New York from a visit to the property.

Capt. W. H. Jeffery, superintendent of the Chambers-Ferland Mine, Cobalt, has retired from that position to devote his time to his Montreal River interests.

Mr. Horace G. Nichols, manager of the Ymir mine, British Columbia, is installing his new slimes-treating process in the new stamp mill being installed at the Jewel mine.

Dr. Milton L. Hersey, of Montreal, has returned from Germany, where he went in connection with the sampling of Crown Reserve ore purchased by the German Government.

Mr. A. B. Willmott, of Sault Ste. Marie, was recently in Toronto on his way home from North Carolina, where he had been investigating iron ore properties for some clients.

Prof. Macoun, of the Geological Survey of Canada, accompanied by Mr. C. H. Young, of Ottawa, has gone



to British Columbia to collect natural history specimens for the Victoria museum.

Mr. Chas. Watson, brother of the chief engineer of the Nipissing and La Rose Mining Companies, has been appointed engineer of the Chambers-Ferland Mining Co., in place of Capt. W. H. Jeffrey.

Dr. W. F. King, Canadian astronomer and boundary commissioner, has left Ottawa for Washington to arrange with Dr. O. H. Teddman, American boundary commissioner, for the resumption of boundary survey work.

Mr. Paul S. Couldrey, manager of the Le Roi No. 2 at Rossland, has resigned to accept a position in another field. Except for an interval spent in Western Australia, Mr. Couldrey has been in charge of the Le Roi since 1902.

Mr. R. T. Hopper, of Montreal, the president of the Standard Asbestos Co. and vice-president of the Dominion Asbestos Co., both of which are included in the merger, will join the board of the Amalgamated Asbestos Corporation.

Mr. C. H. Macmillan, formerly superintendent of the Dominion Iron & Steel Co., who has been recuperating in Maine for a year or so, has been appointed superintendent of the steel department of the company, and assumed his new duties on the first of the month.

### CORRESPONDENCE.

Editor Canadian Mining Journal, Toronto, Ont.

Dear Sir,—On receipt of your issue of April 15th we notice a criticism by Gerald Dobbs on the method of testing air pipes as suggested in an article of ours in your issue of Feb. 15, 1909.

In answer to Mr. Dobbs we beg to call his attention to the latter part of the paragraph on this subject—"Corrections for temperature will be necessary for accurate results, but in practice are not needed."

If the expansion by leakage of the air in the pipe lines can be considered as Isothermal, that is that the temperature is constant, then Mr. Dobbs figure of 7.35 instead of 10 lbs. drop is correct. On the other hand, if the expansion is Adiabatic, that is that the temperature varies, the figure will be considerably more than

this. As it is probable on pipe lines on which there is considerable loss that the expansion would be neither Isothermal or Adiabatic, we have taken 10 lbs. as a convenient figure.

1st. Because it is an approximation between Isothermal and Adiabatic.

2nd. Because it is a convenient figure for the workmen to read.

The average pressure gauge used in this work is only graduated to 5 lbs. Of course this could be overcome by placing a special graduation on the face of the dial, or by the purchasing of more elaborate gauge. Even this would require a special pressure curve to be made for whichever gauge is employed.

As mentioned in our article, we hardly think all this is worth while, as the main point is to stop the leaks, and this can be done quite as efficiently in the rough and ready manner proposed, as can be accomplished by going into the matter in great detail.

Trusting this explanation will be satisfactory to Mr. Dobbs, we remain,

Yours sincerely,

R. E. CHAMBERS,  
A. R. CHAMBERS.

### INDUSTRIAL NOTES.

A Robb-Armstrong high speed engine will be installed at the new central lighting station to be erected at Listowel, Ont.

Southern Wisconsin Power Co., Madison, Wis., has recently installed a 30-ton travelling Northern crane and a 6-ton electric mono-rail hoist, both furnished by the Northern Engineering Works of Detroit.

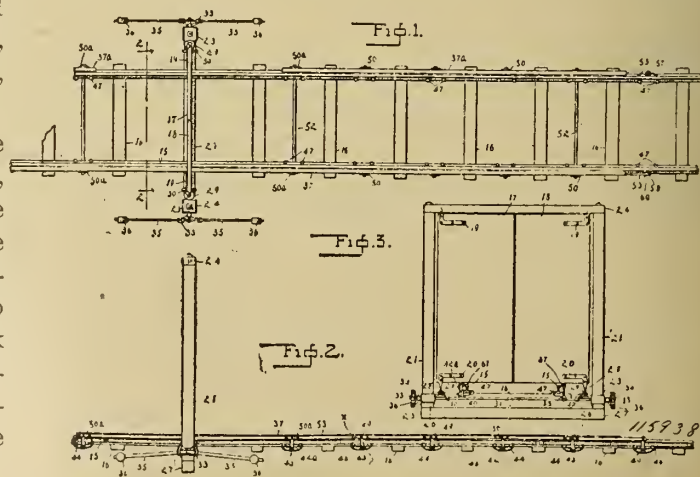
The Consolidated Mining and Smelting Company, at Trail, B.C., is producing a new electrolytic bearing metal, which is claimed to be equal to the highest grade friction alloys.

The San Francisco branch office and warerooms of the Sullivan Machinery Company are now located at 461 Market Street, in the Sheldon Building, instead of at 26 Fremont Street, as heretofore. Sullivan air compressors, diamond drills, rock drills, and other mining machinery are carried in stock at this office.

## NEW MINING AND METALLURGICAL PATENTS.

No. 115,938. Mine Door.—Joseph L. Dinwiddie and Albert F. Braun, both of Carlinville, Illinois, U.S.A., 5th January, 1909; 6 years. Filed 12th September, 1908. Receipt No. 162,417.

Claim.—In an apparatus for the purpose stated the combination with a hinged door and a railway track, of a door operating member arranged adjacent to one of the rails of said track and having its upper edge normally above said track rail, said member being provided with a series of granulated slots, a trip, a trip bar, said bar having a series of granulated slots, rock arms supporting said members and trip bar and engaging said slots, operative means for said door and connection between said member and said door operative means.

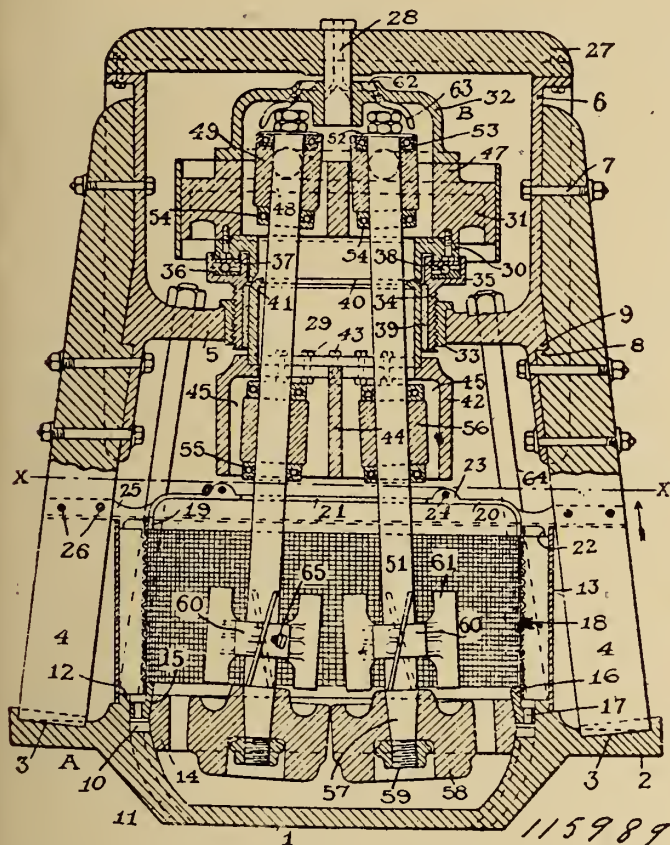




**No. 115,989. Pulverizing Mill.**—George E. Rudnick, Iola, Kansas, U.S.A., 5th January, 1909; 6 years. Filed 25th November, 1908. Receipt No. 164,437.

Claim.—In a pulverizing mill the combination with a base constituting a basin, a die ring within the basin, and a cylindrical screen surrounding and upstanding from the ring, of a revoluble bearing sleeve, means for supporting the same above the basin, a driving element

*Fig. 1.*



connected thereto, a skirt depending from the sleeve, boxes mounted to oscillate within and rotate with the driving element, shafts journaled within and depending from said boxes, said shafts being free to oscillate within the sleeve and skirt, boxes surrounding the shafts and bearing within the skirt, grinding rollers carried by the shafts and disposed to co-operate with the die ring.

**No. 116,019. Steel Manufacture.**—The Pearlite Steel Company, Limited, assignee of Andrew Charles Joseph Charlier, both of London, England, 12th January, 1909; 6 years. Filed 13th July, 1908. Receipt No. 160,652.

Claim.—1. A process for the treatment of low grade steel consisting in immersing the heated metal in a bath into which hydrogen is introduced or in which hydrogen is evolved and reheating the metal after removal from the bath, substantially as hereinbefore described.

2. A process for treating low grade steel consisting in immersing the heated metal in a chilling or fixing bath containing or evolving hydrogen gas which under the action of the constituents of the bath unites with the carbon and iron of the metal to form hydro-carbide of iron, and in reheating the metal after removal from the bath, substantially as hereinbefore described.

3. High grade steel manufactured from low grade steel by the process substantially as hereinbefore described.

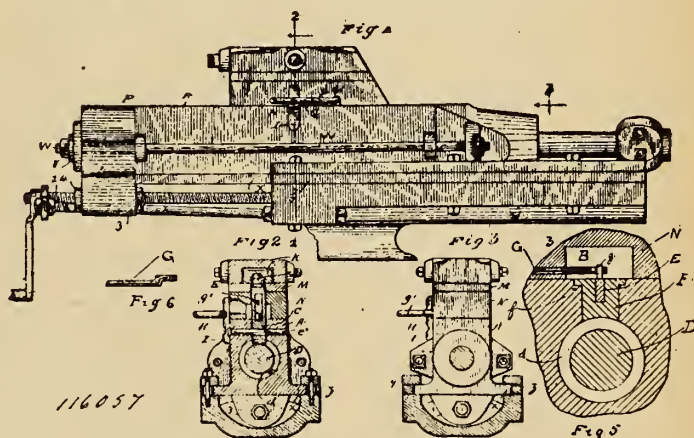
**No. 116,043. Silver Precipitating System.**—Frank W. Pugsley, Cobalt, Ontario, Canada, 12th January, 1909; 6 years. Filed 19th October, 1908. Receipt No. 163,344.

Claim.—1. The herein described process for precipitating silver from thiosulphate solution either calcium or sodium consisting of adding to the solution metallic aluminum in the presence of a fixed alkali, as set forth.

2. The herein described process for precipitating silver from a thiosulphate solution either calcium or sodium, consisting of first filtering the solution and then adding to the solution metallic aluminum in the presence of a free fixed alkali, as set forth.

**No. 116,057. Rock Drill.**—James S. Harlow, Mineral, Virginia, U.S.A., 12th January, 1909; 6 years. Filed 24th August, 1908. Receipt No. 161,887.

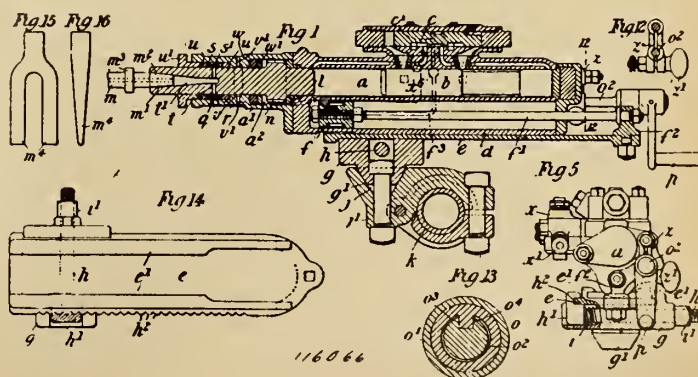
Claim.—A rock drill operating device consisting of a cylinder having suitable ports, a piston therein having shoulders, a tappet to be engaged by the shoulders, a sliding valve controlling ports leading to the cylinder



operated by the tappet, a lever pivoted to the tappet, and means for adjusting the end of the lever into and out of the path of travel of the shoulders of the piston.

**No. 116,066. Rock Drill.**—William Charles Stephens, Carn Brea, Cornwall, England, 12th January, 1909; 6 years. Filed 31st October, 1908. Receipt No. 163,710.

Claim.—1. In a percussive rock drill of the hammer type and wherein the feed motion is automatically effected by air pressure, the arrangement of the feed





cylinder and hammer cylinder side-by-side and parallel with each other for the purpose of shortening the drill, substantially as described.

No. 116,182. Alloy.—Enrique A. Touceda, Albany, New York, U.S.A., 19th January, 1909; 6 years. Filed 7th November, 1908. Receipt No. 163,933.

Claim.—1. A bearing composed of an alloy of lead and cadmium.

2. A bearing composed of an alloy composed of lead and cadmium in which the lead predominates.

3. A bearing composed of an alloy one of whose ingredients is lead toughened and hardened by the presence of cadmium.

4. A bearing composed of an alloy of lead and other metals, said alloy being hardened and toughened by the presence of cadmium.

5. A bearing metal composed of an alloy whose base

is lead hardened and toughened by the presence of cadmium.

## INDUSTRIAL NOTES.

**Sullivan Air Compressors—Booklet No. 106—The Sullivan Machinery Co., Railway Exchange, Chicago, U.S.A.**

We have just received booklet No. 106 describing Sullivan air compressors. The booklet is not a complete catalogue, but is intended to afford an idea of the scope of the Sullivan Company as manufacturers of air compressors. The booklet describes briefly all the Sullivan lines, including "Straight Line," "Duplex" and "Corliss" steam and belt driven compressors.

## SPECIAL CORRESPONDENCE

### NOVA SCOTIA.

**Glance Bay.—The "Free Coal League" and the Dominion Coal Company.**—The "Free Coal League," which, being interpreted, is said to be Mr. W. C. Milner, no more, no less, is very prominent just now, and, assisted by "Farmer," a gentleman whose literary style is strikingly reminiscent of the secretarial pronouncements of the "League," must relieve very largely the labours of the editorial staff of the Halifax Herald in its search for salty "copy." We have heard it said that Mr. W. C. Milner is—

"The cook and the captain bold and the mate of the 'Free Coal League,'

The bo'sun tight, and the midshipmite, and the crew of the captain's gig."

It would interest the public to see the yearly balance sheet of this society. Judging from the name of the "League," it might be supposed that it was formed to fight for free coal, but from the actions of the secretary the public may be pardoned if they assume that the "League" was formed to fight the Dominion Coal Company. Mr. Milner tilts everlastingly at the Dominion Coal Company, and nothing is too hard for him to say about this "bloated monopoly," this "grasping corporation." When the ordinary man has finished one of Mr. Milner's diatribes against this company he is left wondering at the iniquity of the coal barons, who must appear to him, if he believes all Mr. Milner says, as a compound of Standard Oil, Abdul Hamid and Auld Cloutie himself.

For example, Mr. J. S. Willison contributed an article to the Times, which was admitted by every informed person who read it to be a dispassionate and fair presentation of the Canadian coal mining industry in relation to the question of reciprocity in coal between Canada and the United States. Mr. Milner immediately informs the Herald that the article is "replete with misstatements of fact," as is Mr. Milner's polite manner. Mr. Willison presented in rather a novel table the per-ton profits of the Dominion Coal Company for several years past, and showed the steady decline in these from 1902 to 1908. Mr. Milner contradicts the figures given for 1907, which, he states, are a trifle of \$1,200,000 dollars understated, but Mr. Milner omits to say, what he very well knew, that this represented the extra price paid by the Steel Company during the progress of the litigation which is now ended, and that Mr. Willison's figures were quite correct.

Mr. Milner's chief contention appears to be that the Dominion Coal Company charges less for coal in Montreal than it does in Nova Scotia, and that because it now sends coal to Boston with the duty on, it could send infinitely more to Boston if the duty were taken off. Mr. Milner always carefully forgets to say that the coal now being sent to Boston by the Dominion Coal Company is slack coal, and the Dominion Coal Company only seek this contract as an outlet for their winter slack. The business is not a paying one, and everybody knows that any comparisons or figures based on this slack contract are utterly misleading when applied to the coal export trade as a whole. The Dominion Coal Company can mine coal more cheaply than anyone else in Nova Scotia, and they cannot look at New England business to-day, nor could they with the duty off. Mr. Drummond, of the Mining Record, is the bete noir of the secretary of the "Free Coal League," and we suppose if the last-named gentleman ever has nightmare, the Hon. Robert is the bogey. However, it must be admitted that Mr. Drummond knows what he is talking about when he is on the subject of coal mining in Nova Scotia. In the last number of the Record Mr. Drummond writes:—

"Take off the American and Canadian duties on coal, and then Nova Scotia will have in the New England States a market, so we are told, for millions upon millions of tons. How credulous some people are, or how deceitful. At the present time West Virginian coal is selling f.o.b. Boston at \$2.30 a ton, and in cars at \$3.00. How much money would there be in the New England trade for the Nova Scotia operators at that price? They could not look at it. West Virginia coal, for the time being at any rate, has forced Pennsylvania and Ohio coal out of the Boston market. If West Virginia can drive two neighbouring States to the wall so far as coal shipments are concerned, is it likely she would stand by and allow Nova Scotia to enter and hold the field? It is not to be imagined."

Suppose, for the sake of argument, that it were possible by the provision of costly and adequate discharging facilities for the Dominion Coal Company, or any other Nova Scotian company, to oust or successfully compete with United States coal in the New England States under a reciprocity arrangement (which is supposing an impossibility), what guarantee could a Nova Scotian company have of fair treatment in a foreign country if that country began to feel the pinch of Nova Scotian competition? Would any sane board of directors be justified in expending the huge sums of money that it would be



necessary to expend to get any portion of the New England market, under such circumstances, and what assurance could a Canadian company be given that the duty would not be reimposed? Surely the citizens of Canada have lived alongside of Uncle Sam long enough to know him better than that.

In Mr. Milner's contention that the Dominion Coal Company is doing injustice to Nova Scotian operators by the price of coal it is charging in the Maritime Provinces as compared with its St. Lawrence markets, he entirely ignores the fact that the Dominion Coal Company is supplying practically one-third of its entire output to the Dominion Iron and Steel Company at a figure which is below the cost of mining. Take away from Cape Breton the Dominion Coal Company and the steel industry, which the first-named company in a large measure supports, and what would be the consequences? Mr. Milner attempts to prove that the Dominion Coal Company is an incubus and a hindrance to the legitimate expansion of Nova Scotian industries and the province generally. The fact of the matter is that the incorporation of the Dominion Coal Company was the inception of the greatest impetus that has ever been given to the advancement of the Maritime Provinces. That is a fact that can neither be controverted nor denied.

Mr. Milner's other argument is that coal is sold to the railways and large business concerns in Montreal at a cheaper rate than it is sold to the householder and the Gas Company in Halifax. We very much doubt Mr. Milner's sincerity when he complains of the low price that is paid by the railway companies for their coal, but if he is willing to purchase coal in the same quantities in which it is purchased by the railway companies he could get it at the same price. This condition of affairs is not confined to Nova Scotia. In England coal is sold at the pit mouth to the railway companies at from \$1.50 to \$2 per ton. The same coal is sold to the workmen who mine it at from \$2 to \$2.50, and to outsiders under the screens at from \$3 to \$3.50 per ton. In London, about half the distance from the mines that Halifax is from Cape Breton, the same coal will retail at from \$5 to \$7 per ton. In Germany the same is true, and in the United States it is said the railways take the coal companies by the throat and squeeze them dry. Mr. Milner should take an elementary course in the laws of trade, and he might enquire how it is that Canadian cheese and Nova Scotian apples can be bought for less in London, England, than they can be bought for in Sydney, Nova Scotia, and why the American coal operators can "dump" coal in Canada at prices that may bring them 5 cents profit and may not.

It is a fond hope that the abolition of the duty on American coal would give Ontario and Quebec much cheaper coal. So far as Ontario is concerned, the price of coal would not be reduced one cent. For all practical purposes Ontario is outside the present available territory of the Nova Scotian coal companies. The only hope for Ontario to get cheaper coal is the construction of the Georgian Bay Canal. If this canal is excavated to a depth that will allow the transportation of ocean borne coal from the Maritime Provinces, it would immediately put the Nova Scotian operators in a position to compete with the United States operators in a territory from which at the present time Nova Scotia is barred. The price of coal would then be lowered by reason of Nova Scotia competition. Should this canal be constructed there is no reason why the Nova Scotia coal trade should not extend its territory until it meets the field of the Alberta mines, and Canada would thus be independent of the United States, so far as coal is concerned, throughout the length and breadth of the whole Dominion. So far as Quebec is concerned, a removal of the duty would for a time give the people of that province cheaper coal, but it would only be a temporary reduction. Under such circumstances there would only be three coal companies in the whole of Nova Scotia that would continue to exist, and their output even would decline until American mines would have absolutely no competition in

the Province of Quebec. Then what guarantee have the people of Quebec that the price of coal would remain at reduced figures? It might be raised—it would be raised. Such things have happened, and there are such things as "combines" in the United States. We are told that once upon a time American anthracite coal was sold at \$3 per ton in Ontario, and that to-day it sells at from \$6 to \$7. The same thing would happen to the price of bituminous coal eventually should reciprocity ever be introduced.

We submit that the Dominion Coal Company, Mr. Milner to the contrary notwithstanding, is not a grinding monopoly, but is a beneficent business enterprise which has very greatly increased the prosperity of the Dominion as a whole, and of Nova Scotia in particular. It has not extorted unfair prices for its product, and it has not used the "big stick" on the smaller operators. As an employer of labor its record is good, and in this particular it can challenge the majority of the coal mining companies in this continent. Since the date of its incorporation the company has never had a strike, or a serious labor trouble, and that is sixteen years ago. The present little disturbance has been engineered by a foreign organization, hailing from the country that is now asking free admission of its coal. The conditions of mining cannot be excelled on this continent, and when it is considered that the Dominion Coal Company have produced over 35,000,000 tons in sixteen years, and in that time, with the exception of one small explosion which caused the death of eleven men, they have had no serious disaster causing loss of life, it must be admitted that they are careful miners. This is partly due to naturally safe conditions, but not entirely so. We have advocated this point of view ad nauseam, but it seems necessary. The company is well managed, and conservatively financed, and when Dr. Milner says its stock is watered he does not write the truth. As a matter of fact the capital of the Coal Company is small compared with its vast holdings and possibilities. It possesses what is probably one of the most valuable bituminous coal deposits in the world, and has a plant which always astonishes visiting engineers by reason of its completeness and extent. If anyone doubts the excellent shape of the Dominion Coal Company's properties let him read the published accounts of the recent visit of the British Institution of Mining Engineers, and he will be enlightened from an English point of view. Many of the Coal Company's men have at times gone to the United States to better their fortunes, but they invariably come back, and in many instances have written begging for free transportation, as conditions in the States were not so rosy as painted. The same is true of men from the "Old Country." They go home, but always come back. Safety lamps are a thing of course, high explosives equally so, there is no "shooting" by unskilled men, no "shooting off the solid," and every precaution that is reasonable is taken to preserve life and property. The company's Rescue Station was the first this side of the water. All these matters are carefully ignored by the "Free Coal League."

If the "League" will change its name and call itself "An Association for the Villification of the Dominion Coal Company," it will appear in its true colors. Its present cognomen is not justified, unless by "free coal" we are to understand Mr. Milner would like to get his fuel for nothing at all!

#### **The Aftermath of the Conciliation Board.**

Some few days after the publication of the findings of the Board of Conciliation which recently sat at Glace Bay, two emissaries of the U.M.W.A. arrived in town with cheques to the amount of \$20,000, which they deposited in one of the banks. All the available newspaper reporters were asked in to the bank to assist in the ceremony, and their attention was carefully called to the fact that the cheques represented real money, and, further, there was lots more where that came from. This



theatrical proceeding was followed by various high-flown utterances, which duly appeared in all the glory of print, for the edification of all true believers. The consideration given by the local press to the utterances of the U.M.W.A. delegates has been carried to the point of indulgence, and whatever else these uninvited and unwelcome disturbers of the public weal may have done—and they have very much to answer for—they have plainly impressed the local newspapers. One Sydney newspaper thus described the journeyings of one of these walking delegates: "By the Intercolonial Express this morning Mr. H. W. Bousfield, plenipotentiary extraordinary of the United Mine Workers of America, who has for some days been visiting the Cape Breton coal region," etc. This was written in all seriousness, and was followed by three and a half columns of the things that the American ambassador had deigned to import to the listening reporter. It is no wonder that some of our visitors become afflicted with a further accession of vanity when they see how seriously supposedly reputable newspapers take their vaporings, and some of them really begin to think they are making a noise in the world. This particular agitation was begun and has been fostered right up to the present time by newspaper talk, and garbled, and even actually untrue statements have appeared in Montreal newspapers, that should have known better than to print unedited news from unreliable correspondents. Until we get two days' old newspapers from Montreal we never realize down here how interesting events have been in Cape Breton. A large proportion of the "news" about Cape Breton that has appeared of late in the Montreal and Toronto newspapers is really fiction, and such fiction as speaks volumes for the imagination of correspondents and the credulity of editors.

The latest addition to the forces that are seeking to disrupt the public peace in the mining districts is a rag that is outside the pale of decent newspaperdom. This broadsheet is called "Cotton's Weekly," and is printed at Cowansville, P.Q. Some persons unknown have kindly distributed broadcast a large number of copies of this paper, and a few excerpts may show the kind of literature to which we are being treated. Referring to the Glace Bay Board of Conciliation this sheet remarks editorially that the two arbitrators were "either knaves or fools." "These huckstering arbitrators, although they can get their opinions splurged through the columns of the capitalist press, will not befoozle the workers." This is rather a severe castigation of two gentlemen who voluntarily performed an irksome and thankless duty to the best of their ability. We would like to know exactly what operation is covered by the verb "to splurge." It is cheering to note that the total circulation of this poisonous rag is only 2,400 altogether, and Prince Edward Island takes but two copies. P. E. Island should be thankful. "Cotton's Weekly" bestows its blessing upon the U.M.W.A., and refers to the P.W.A. as "the pet of the big companies." It is interesting to know the company that is kept by the U.M.W.A., and it would be more interesting to know who paid for the free distribution of these papers.

"Cotton's Weekly," like its friend the U.M.W.A., has a decided dislike for the Lemieux Act, which it terms a "capitalistic law for squeezing the workers." Evidently the Canadian socialist does not know advanced social legislation when he meets it. The principles and the workings of the Lemieux Act have evoked warm encomiums from socialist newspapers and reviews in other countries. Just recently "Der Sozialpraxis," a prominent review dealing with social politics, published in Berlin, has devoted a good deal of space to the consideration of the Lemieux Act, and sums up its conclusions as follows: "The Canadian Parliament has evidently achieved something great in passing the Lemieux Act, which provides a Court of Arbitration, and so far its advantages have greatly preponderated over its failures. The happy solution Canada has found to the difficulties which are so often arising with

regard to coal mines, railways, etc., might well serve as a model for the legislators of many European countries." The German review pays a graceful compliment to the soundness of the legislation which has distinguished the over-seas Dominions of the British Empire. In Canada most people are content to judge by results, and there have been few pieces of legislation which have had such ample justification in so short a time as the Industrial Disputes Act of Canada. It is but natural that the U.M.W.A. should dislike the Lemieux Act. The U.M.W.A. has its headquarters in a country that is several laps behind Canada in the matter of social legislation, a country where industrial disputes are largely settled by such crude methods as strikes and lock-outs. We are a long way beyond that stage of development here, and in Canadian eyes the U.M.W.A. is a body of reactionaries, a reversion to the primal type. Industrial conditions in Canada are far better than they are in the United States, and so far as relates to the condition of the mining population life is much pleasanter for the miner in Cape Breton than it is in Pittsburg. Some interesting independent testimony was given on this in the House of Commons by Mr. Ralph Smith, the member for Nanaimo. Mr. Smith stated that he had spent some time in investigating the conditions under which the mining population of the Pittsburg district were living, and his remarks may be quoted with profit. Mr. Smith says: "After a man has gone through an experience of this kind he is prepared to regard even the worst conditions in Canada as favorable in comparison. I want to say that the coal miners of England fifty years ago were in a better condition than the coal miners in the surroundings of Pittsburg are to-day. . . . In hours of labor, in wages, in the prices of commodities that they require to use, our industrial classes in Canada are very much better off than those in that old settled district of Pittsburg. . . . Therefore I say that we have reason to congratulate ourselves that we are so favorably situated." To put it plainly, the Canadian miner, did he but know it, is in a position to act as teacher to his comrades in the United States, and he is doing despite to his privileges when he consents to follow the guidance of the U.M.W. of America.

#### QUEBEC.

**Thetford Mines.**—Work at the various mines is progressing on about the same scale as last season. It is expected, however, that the production will be materially increased as the season advances. The new properties are pushing their building and development as rapidly as possible. The Thetford Asbestos and Exploration Co. have three cable derricks under way, and are removing the earth-burden so as to be ready for mining operations as soon as the mill is finished. The plans for the mill are about ready and building will be pushed rapidly. The mineral showing is good. The Robertson Asbestos Co. have their mill nearly ready and hope to be producing early in June. The Imperial Asbestos Co., at Black Lake, have their plans under way for their mill. C. S. Saunders is appointed manager for the new company.

The Royal Trust Company, of Montreal, is reported to have bought one-third interest in the Ward-Ross property, s.w. half Lot 27, Range V., Thetford. The price named is \$100,000.

Recent visitors to the town are Earle C. Bacon, New York; Messrs. J. A. Jacobs and Mortimer Davis, Montreal; N. A. Timmins, Haileybury, Ont., and Messrs. Sam and Charles Turner, of Turner Bros., Rochdale, England. The McGill mining students, in charge of Mr. John A. Dresser, made an inspection of the camp on April 28th and 29th.

**Black Lake.**—The Union Asbestos Mines, Alfred Calmon, Hamburg, Germany, is under option till May 30th to McCuaig & Co., Montreal.



**East Broughton.**—The Boston Asbestos Co., the Broughton Asbestos Co., and the Ling Asbestos Co. are the present producers, with the Frontenac and Eastern Townships Asbestos Companies to commence at an early date. The Broughton Asbestos Company have just changed from steam motive power to electricity, which is supplied by the Shawinigan power lines. Mr. J. J. Penhole is appointed manager for the Ling Asbestos Company.

**Danville.**—The Asbestos and Asbestic Company are working their mill two shifts as usual. The new mill, which is about completed, is of particular interest on account of several new features introduced into the Cyclone whereby the deteriorating influences, which in the past have been the serious objection to this machine, will be reduced to a minimum.

**Capelton.**—The mines of the Nichols' Chemical Company have been closed for a considerable period. The old ore bodies were worked out as completely as possible. The company's chemical works are producing as usual from ore received from the surrounding locality, and particularly from the Eustis Mining Company. The Eustis Mining Company, under Superintendent Adsit, is working vigorously and producing about four thousand tons per month. A modification of the milling system similar to that used by the Granby Mines, B.C., is being employed and with good success. The motive power is supplied by an up-to-date electric plant.

Considerable speculative conversation is indulged in bearing upon the importance of the copper deposits of the Eastern Townships, and indications point to a movement in prospecting for this mineral and developing old, abandoned workings as soon as the price of the metal reaches the proper figure. J. R. Duckett, of Montreal, has taken option on several hundred acres of land near St. Joseph, Beauce, from which he shows very fine samples of bornite and chalcocite in a vein two feet wide. He purposes to proceed with development at once. Apropos abandoned workings and prospects, we are much interested in R. W. Brock's suggestion in April 15th Journal regarding an "Inventory of Promising Mineral Claims." We think Quebec heads the provinces for the number of mineral claims just opened up and now lying dormant, and also for lack of knowledge regarding these, and even of properties of proved importance. Mr. Brock's scheme would prove a great saving of time and capital and unquestionably an impetus to the mineral industry.

#### ONTARIO.

**Cobalt.**—Under date of May 1st it was stated that Mr. J. Houston, of the Right of Way Mine, had been appointed consulting engineer for the Nipissing. This was a mistake as Mr. Houston has been appointed consulting engineer for the Little Nipissing, not the Nipissing.

In our issue of March 15 the statement was made that Mr. Bannell-Sawyer had bought the Milne property. This has not been confirmed.

Three new boilers are being installed at the O'Brien Mine. Two are 150 h.p. each and one is 100 h.p., the working pressure for all three being 150 pounds. These boilers are manufactured by Goldie McCulloch and are to be used to supply power to run the big 250 k.w. generator, which will be direct connected to the engine.

The Kerr Lake will probably make an addition to their plant in the shape of a new 12-drill compressor. The main shaft on the No. 3 vein will be continued to greater depth. The vein in the lowest level shows a good width of very rich ore.

A party of business men from the Maritime Provinces recently came to Cobalt to look over some of the principal

mines and to obtain an unbiased opinion of the possibilities of the district. Although their stay was only a short one they saw enough to fully convince them of the greatness of the mines.

Captain Jeffreys has sent in his resignation as superintendent of the Chambers Ferland. Mr. Chas. Watson, of the Nipissing, is temporarily filling the position.

To those best posted on conditions in this district it would appear that before long the majority of the mines in Cobalt will be controlled by two or three syndicates. The Consolidation of the La Rose properties was one of the first indications of the change, and the recent change in the management of the Chambers Ferland would seem to indicate that this property will be absorbed by the Nipissing. The Lewishons have control of the Kerr Lake, and have also at the present time a deal on for the purchase of the Drummond. It is well known in camp that they are anxious to increase their holdings and that they have bid high for one or two other important mines. The Jacobs Exploration Company is also another important factor, owning many properties in Coleman and Lorraine. It is stated that the Nevins interest in the Cobalt Central have acquired control of the Foster.

A rich strike was made at Temiskaming Mine on April 30th on their No. 4 vein. The ore was encountered in a winze, sunk from a cross-cut, midway between the two shafts on the 250 foot level, and will run about 30 inches in width, of high grade ore. The find was made at a depth of 280 feet from the surface, which is so far the deepest working on the property, and will have a very important bearing on the future of the mine. Despite the many unfavorable rumors concerning the Temiskaming, the mine was never in better shape and the development work is kept well ahead of the stoping. The ore in the 250 foot level is even higher grade than that encountered in the upper workings and the work of sinking the main shaft is being steadily pushed forward so that new levels may be opened up.

The annual report of the Nipissing Mines lately issued shows that in 1908 the company shipped 2,803 tons of low grade and 702 tons of high grade, having a total silver content of 2,893,931 ounces, with a net value of \$1,363,783. The total cost of production was \$575,213, or a little over 20 cents per ounce. The cost of production may seem high in comparison with some of the other mines, but the large number of workings, located at considerable distance from one another, will account for a large administration and mining expense. The company has the largest acreage of any in camp, 846 acres, a large portion of which is still practically unprospected. The large ore body found some time ago in the No. 64 shaft is being developed, a drift having been run nearly sixty feet on the vein, which shows for the entire length an average of 16 inches of high grade ore. The ore reserves of the Nipissing are at present estimated to be about \$2,500,000.

After lying undeveloped for about five years work is at last to be started on the famous Lawson property. This property has been taken over by the La Rose and paid for by the issue of treasury stock which was kept for that purpose. For the present the base of operations will be in the old shaft at the northern end of the property, which was sunk by the Silver Leaf Co. Through an error in the survey this shaft was sunk and the Lawson lot instead of the Silver Leaf. Drifts will be run to the south on the vein, and it will probably not be long before shipments will be made.

On April 22nd a new vein was discovered on the surface, at the Chambers Ferland. The vein lies behind the company's office, about 250 feet distant from the No. 2 shaft, and is from two to three inches in width, carrying smaltite and some silver values. The east cross-cut from the 80-foot level of the No. 2 shaft will need to be continued only about forty



feet to tap the vein. Drifting is being carried on from the bottom of the No. 1 shaft and raise will be started from the drift to connect with the upper body preparatory to stoping. Work has been started on the La Rose vein, which was caught last fall by the Right of Way, while working for the Chambers Ferland, and the vein is holding its original width and values. Twenty-five additional men have started work surface prospecting, and this force will be largely augmented during the next few weeks. The management expect to discover several of the Nipissing and La Rose veins in the north and west ends of the property. The Chambers Ferland is one of the heaviest shippers in the camp and it is well within the range of possibilities that it should become a dividend payer in the near future.

It is reported that two new high grade veins have been discovered by the diamond drill working on the Drummond.

A plant will shortly be installed at the Bailey Mine which will probably consist of two 100 h.p. boilers and a 12-drill compressor. Meanwhile the development work is being pushed as rapidly as the limited facilities will allow.

The Silver Lode Mining Co. at Cross Lake, formerly known as the Queen Alexandria, will install a plant consisting of a 30 h.p. boiler, a hoist, and two drills. The shaft has already been sunk to a depth of 75 feet and will be continued deeper.

It is stated that the Haileybury Silver Mining Co. have sold the south half of their property, consisting of twenty acres, to New York and Buffalo parties for \$100,000. The money realized from the sale will probably be used in developing on a more extensive scale the remaining twenty acres.

A force of men are now engaged in surface prospecting at the Kerr Lake Majestic. The underground development is also making good progress, and the main shaft is now down over 75 feet. Sinking will be continued to the 125 foot level before a station is cut.

A surface vein showing good silver values has recently been discovered on the Farah property.

Good progress is being made at the Empire Mine, which now has a force of about 16 men at work. The shaft has been sunk nearly 100 feet, and will be continued to greater depth.

A contract has been let to sink a shaft on the property of the Cobalt Bullion Mining Co., near Sasaginaga Lake. It is probable that some diamond drilling will also be done.

Another strike has been made on the Right of Way while cross-cutting from their No. 3 shaft. The ore is high grade and was discovered on the 75 foot level about 350 feet from the shaft.

A new vein has been discovered on the property of the John Black Mining Co. The vein matter consists of calcite, with some smallite and low silver values, and was discovered 200 feet north from the main shaft. The shaft is now down forty feet, and when the 100 foot level is reached a cross-cut will be run to tap the vein. The steam plant recently installed is supplying power for one drill.

The Little Nipissing expects to start work shortly sinking the shaft on their property at Short Lake. The shaft is now down 60 feet and will be continued to the 150 foot level. Air will be obtained from the Silver Queen Mine.

It is reported that the Silver Bird has been leased to the Michigan Development Co. and that work on the property will be started shortly. The mine is located north of the Colonial, on Farr Creek.

The Silver Cliff Mine, which has been closed down for some time, will again commence operations under the management of the original owners.

At the Otisse Mine a four-inch calcite vein with high values in native silver has been encountered in the cross-cut at the 70 foot level.

The Johnston Mines, Limited, owning seventeen claims in Coleman, have let a contract for sinking a 125 foot shaft on one of their properties.

The Motherlode Mine, in James Township, purpose sinking a 100 foot shaft near the mouth of the tunnel, and it is expected that the vein will be cut at that depth. So far all the work has been carried on from the tunnel, which is now in over 300 feet, and the vein continues to show good silver values. A winze has been sunk 50 feet below the level of the tunnel, and from the bottom a 60-foot drift was run on the vein which shows the same width and values as above.

Great activity is being displayed in the Elk Lake district, which promises to become one of the important mining sections. A steam plant is being installed on the Cummings properties and two of the boilers are already on the ground. A shaft will be sunk to the 100 foot level. The United States Mine have let a contract to sink two shafts, 100 feet each, with 200 feet of drifting at the bottom. The Silver Alliance Mine, adjoining the United States on the west, are sinking two shafts by contract, each of which is down about 45 feet. Good progress is being made at the Elk Lake Cobalt Mines and a large force of men are engaged in the mining operations and the installation of the plant, which will shortly be running. The shaft is down to the 100 foot level and will probably be continued much deeper. Several other smaller properties in this district are preparing to operate during the summer months.

The "Big 6" Mine is installing a plant consisting of two 40 h.p. boilers, a four drill Rand compressor, dynamo, pumps, etc. As some of the machinery arrived too late to be taken in over the winter roads the plant will not be in operation until after the opening of navigation, when the remainder can be taken in. The main shaft is now down over 75 feet and will be continued deeper before stations are cut. A force of 26 men are at present employed on the property.

The plant of the Montrose Syndicate, in Lorraine, is now running and the development work is proceeding much faster in consequence. A new head frame has been erected and also a new boiler-house near the shaft. The shaft is down 40 feet and will be sunk 100 feet before any drifting is done.

Air for the Pan Silver is being obtained from the Temiskaming. The shaft is now down about 150 feet, and 25 men are employed on the property.

A contract has been let by the Gifford Cobalt to sink their shaft an additional 90 feet from the 110 foot level.

Mr. J. Houston has resigned his position as superintendent of the Right of Way and will go up the river to take charge of the Bonsall claims. It is probable that he will be retained by the Right of Way as their consulting engineer.

Shipments for the month of April were 2,493 tons, and for the first four months of the year 9,459 tons. This is considerably in excess of the corresponding periods for last year.

The number of deaths lately, due to accidents in the mines of the Cobalt district, points more than ever to the need of an inspector to be located permanently in this district. The present inspection is excellent as far as it goes, but the field that the inspector has to cover is so large that visits to the mines here can only be made at long intervals and as a consequence many of his recommendations are partially, if not wholly, ignored. When an inspector has made his visit to the mine and notified the management of the changes necessary, he should have the time at his disposal to revisit the mine in the course of a week or two, to see that these changes have been made. Under present conditions this is absolutely impossible. It is undoubtedly true that in some of the mines the management is lax in looking after the safety of their men as it should be done, and there is plenty of work in this camp alone to keep an inspector busy all the time.



## BRITISH COLUMBIA.

**Rossland.**—Indications point to a profitable year for the mines of this district, even though there have been a number of drawbacks so far this season. All over the province there is a healthy activity, and while some of the big mining companies are playing for time until copper strengthens a little, yet they are, or will be, in a splendid position to take advantage of a rise in price when it comes about, which we anticipate may be in the months of July or August. Here at Rossland the Centre Star-War Eagle group of the Consolidated Co. is right now in a position to more than double its output; the Le Roi 2, Limited, could also increase its output, although its main efforts will be concentrated on the retimbering and deepening of the Josie shaft from the 900 to the 1,200 ft. levels for a while to come. It is hoped that an extensive plan of operations will be laid out for the Le Roi and with the prices of copper and silver at an advance over present quotations there is a quantity of ore in the mine that could be shipped at a fair profit.

At the present writing there are about 570 men working at the Centre Star group, Le Roi 2, Limited, Blue Bird, I. X. L., Hattie Brown, and O. K. mines, the pay roll running about \$60,000 per month, but this force will be materially increased before the season has gone much farther.

The Le Roi 2, Limited, is making a very good showing. A diamond drill hole put down on the 400-ft. level to locate the continuation of the ore in the 301 stope met with ore from 299 to 308 ft., 5½ ft. of which assayed 1 oz. 10 dwt. gold and 1.81 per cent. copper. During the month of March the Le Roi 2, Limited, shipped to Trail smelter 2,620 tons of ore. The total smelter receipts were \$62,361, in settlement of 112 tons of concentrates at \$29.55, and 3,263 tons of ore at \$18.11, net over and above freight and treatment charges. This is a fine average for Rossland ore.

The Centre Star group of the Consolidated Co. continues to make over \$30,000 per month net on each month's operations. The average grade of ore extracted during March was \$11.10 per ton. The ore body on the ninth level of the War Eagle opened up 50 feet wide, carrying \$20 to \$50 gold per ton. During March the Centre Star-War Eagle group shipped approximately 14,000 tons of ore, which if it averaged \$11.10 per ton, and the freight and treatment charges are under \$5.55 would leave a gross profit on the operations of the mine for the month of over \$77,000. The last month at the Consolidated Co. Trail smelter was the largest in the history of that plant in the way of silver bullion production. A record was also made in the refinery turning out pig lead. Including the work at the St. Eugene, which is showing up a lot of new ore, it is estimated the Consolidated profits last month were about \$70,000 net. It is not thought that the Southern Alberta coal strike will affect any of the properties of the Consolidated as this concern has several months' fuel in the bins.

The ledge on the Hattie Brown has opened out to 6 feet in width and a strike of ruby silver is reported in the shaft. The lessees of both the O. K. and I. X. L. have ore sacked and ready for shipment. The prospects for activity in the leasing way in this camp during the coming summer are good as a number of the old miners who have their homes here have determined to keep themselves busy and try and make a strike in this way during the next few months.

**The Boundary.**—Ore shipments in the Boundary have dropped off a little in the last couple of weeks, the Oro Denoro not shipping and the Granby only mining enough to keep part of its furnace battery at the smelter glowing, two of the furnaces now undergoing the enlarging process. By July this augmentation of the entire eight furnaces will have been completed and the Granby will have a smelting capacity of 4,500 tons per day and the mines and smelter will be worked to full

capacity if the price of copper warrants such action at that time. This would mean 135,000 tons per month, or 1,620,000 tons per year, if steady operation could be maintained, but this is a physical impossibility as drawbacks in the way of labor, fuel and repairs are almost bound to crop up. It is anticipated, however, that the tonnage for this year will exceed that of last, when it was 1,037,544 tons, returning net profits of something over \$700,000. A mine like the Granby property, however, does more for the good of the community and classes than, we will say, some of the mines at Cobalt. Where the Granby has to employ extensive means and men and a big plant to take out and treat its million tons of ore and make a profit of \$700,000 it is said 2,000 tons of Cobalt ore will yield the same profit, most of which the classes never get a glimpse of—except the capitalist class.

The British Columbia Copper Co. has put a small force of men at work in the Oro Denoro mine. It is likely, however, that all of the property of the B. C. Copper Co. will be closed down unless the company makes arrangements for a coke supply other than that from Coleman, where there is now a strike in progress. A conciliation board, under the Lemieux Act, has been appointed, to settle some minor differences between the B. C. Copper Co. and the Miners' Union. A shut-down would give the contending parties a lot of spare time to talk things over.

A large body of good ore has been opened up in the Greyhound, which adjoins the Mother Lode. This is a promising property and will be heard from later in the annals of Boundary mining history.

Frederic Keffer, consulting engineer for the British Columbia Copper Co., has been over the coal fields of Nicola and Princeton districts. There is a probability of these coal fields supplying fuel for the Boundary mines and smelters in the not distant future. A considerable saving in freight could no doubt be effected over fuel brought in from the Crow's Nest and other outlying points.

The Nicola Valley Mines are now shipping more than at any time heretofore. During February and March 16,000 tons were produced, but it is estimated that April shipments will exceed both of these two months combined. A new steel tippie and other facilities will be installed soon, when shipments can be materially increased.

The Protective Committee in Dominion Copper affairs has appointed Price, Waterhouse & Co., chartered accountants, to audit the accounts of the company; it also states that a mining engineer of high standing in the profession is to examine the property. This committee claims to have 300,000 shares of stock and \$100,000 in bonds behind its actions. We can only trust that the thing will be equitably adjusted in the end, but the whole thing looks pretty hazy just now.

**Nelson District.**—The Canadian Metal Co. is going into voluntary liquidation at a meeting to be held in Nelson on June 12th. S. S. Fowler, engineer, Nelson, will be appointed liquidator. A new company is to be formed, known as the New Canadian Metal Co., with a capital of \$1,100,000; 100,000 shares par value \$10, and 100,000 dividend shares par value \$1 each. The shares in the new company will be issued 75 per cent. fully paid, leaving 25 per cent. to be paid by the subscribers for stock in the new company. This is where the old shareholders "dig up" or "drop out." The Canadian Metal Co. did not have much luck in its operations and has dismantled its zinc smelter erected at Frank, Alberta. The company is still interested in mines and at Pilot Bay smelter, these to be turned over to the new concern.

The new coal handling plant of the Crow's Nest Pass Coal Co. at Fernie, B.C., is now working. It is said to be one of



the largest in Canada, handling 12 tons per minute with 17 men. This work formerly required 68 men.

A good strike of magnetic iron ore is reported as having been made on Campbell River, Vancouver Island. J. McLennan, D. McPhee and S. Smith have each staked claims along the showing, which averages 20 feet in width. The property is easily accessible for development and there is coal and timber close at hand.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Sydney.**—The Dominion Steel Company has received an order from the Great Northern Railway Company, of Sheffield, Eng., for 5,000 tons of steel rails. The rails are of standard lengths and 85 pounds weight. This is the first order the company has received from an English firm. New rolls have had to be made to fill this order, as specifications for contract call for bullhead rails, widely different from the ordinary flange in use in Canada.

A Sydney paper says: "At this date the Nova Scotia Steel and Coal Company have at least 120,000 tons of coal banked at its several collieries, and this quantity is ample to supply its steel plant for fully eighteen months, so that in the event of the miners being called out at these collieries the steel plant can still be operated to its full capacity for a year and a half."

The U. M. W. A. have applied for another conciliation board to adjust some grievances between the United Mine Workers employed by the Nova Scotia Steel and Coal Company and that company. An increase in the wages of miners compelled to work with safety lamps is demanded, as it is claimed that the lamps lessen the earning power. The men also claim that the employees at No. 3 Colliery are discriminated against because they are members of the U. M. W. A.

A syndicate has been formed to go into the coal carrying trade. One steamer has already been purchased, and the acquisition of a number of others this year is being considered. The syndicate was formed as a result of the withdrawal from the Canadian coasting trade of all foreign steamers of under fifteen hundred tons.

### QUEBEC.

**Thetford.**—The Beaver Asbestos Mines have suspended operations for a time. The 250 men employed refused to work because an additional half hour's work every day was asked of them in order to pay for the laborers' insurance. This strike will not cause big damage, as the demand for the mine's products is not great at present.

### ONTARIO.

**Cobalt.**—The La Rose has taken over the famous Lawson mine, which has been involved in bitter litigation practically since its discovery in 1905. The La Rose Company will start immediately to develop and prospect the Lawson, which is one of the richest properties in the Cobalt district.

Eight drills are at work on the Crown Reserve. Six machine drills are being used for development work and two stopping drills in taking down ore on the main vein.

The Kerr Lake is now mining the deepest in the camp, and have six inches of ore at a depth of 400 feet. There are seventeen veins on the property which show pay ore.

Of the 846 acres owned by the Kerr Lake Company, 383 are still unexplored, and the remaining 463 acres are only partially prospected and developed. The recent discovery of a well-defined vein of rich ore at the 172-foot level in shaft No. 64,

which is 16 inches in width and assays 1,700 ounces of silver to the ton, shows the possibilities of this partially prospected territory.

A shaft is down 140 feet on No. 3 vein of the Savage mine, with levels cut at the 75 and 135 foot levels. On the 75-foot level 100 feet of drifting has been done, and cross-cutting to the vein on the 135-foot level has been started.

Six concentrators are now in operation at Cobalt, and four more are in course of erection. During 1908 ten smelters treated ore from the camp. The shipments during 1908 were greater than the combined shipments of the four previous years. There are now 3,500 men employed in the mines in this district.

The Little Nipissing expect to start sinking the shaft on their Short Lake property shortly. Air connections have been made with the Silver Queen, and a drill will be installed. The shaft is down 60 feet on an 18-inch calcite vein, and the shaft is to be continued to the 150-foot level before a station is cut.

**Gowganda.**—C. H. Fullerton, civil engineer, has been sent north by the Department of Public Works to survey the route for the summer road to Gowganda. The estimated distance is 32 miles. Construction is to begin about June 1st.

**Toronto.**—The Ontario Government has decided to sell a portion of the Gillies timber limit, and tenders will be received until June 15th. One thousand acres in the north end of the limit are to be put on sale in parcels of twenty acres each, and will be sold subject to a ten per cent. royalty on all ore produced. The total area of the limit is 100 square miles, or 64,000 acres. The portion of the area containing the Provincial Mine is reserved, and will not be put on sale.

1,439,300 acres of land in the District of Algoma have been thrown open to prospectors. The land lies north of Sault Ste. Marie, and is to be open for prospecting until December 31st, 1910. Any iron, coal, iron pyrites or nickel is reserved for the Algoma Central and Hudson Bay Railway, under the terms of the grant made to the company when the land was set aside about five years ago.

### ALBERTA.

**Lethbridge.**—Practically all the coal mines in Alberta are now idle as a result of the strike. A meeting was held at Taber, and the miners made a demand that none but union miners be employed in the mines. This was refused, and as a result the miners stopped work.

The situation continues practically the same throughout the other Alberta camps. Some places are beginning to suffer through shortage of coal.

### BRITISH COLUMBIA.

**Rossland.**—At the present time the Rossland mines employ 565 men, and the pay roll is \$58,000 per month. The Centre Star leads with 410 men on the pay rolls, followed by Le Roi No. 2 with 125 men. In 1905 the average number employed was 750, and in 1908 it was something over 800.



**Greenwood.**—In the dispute over wages and hours between the B. C. Copper Co. and its men, the company has nominated Mr. E. Crown, barrister, of Toronto, as its representative on the Conciliation Board. Mr. John McInnes, M.P.P., represents the employees.

The B. C. Copper Company's Mother Lode Mine has been closed down as a result of the coal strike, and the smelter was expected to close down May 1st, as its reserve coke supply was all exhausted.

**Ymir.**—At the Yankee Girl there are at present 25 men at work. The tunnel is now in 1,500 feet in ore valued at from \$20 to \$60. Arrangements are under way to take up all deferred payments on the property. A tramway and concentrator are planned, but will not be erected at present.

**Nelson.**—At the Queen Mine at Salmo, work is at present being carried on in the 500-foot level. The lowest grade ore so far milled has averaged between \$8 and \$9 per ton. The property produces approximately a \$5,000 brick every 14 days. The mill capacity of 10 stamps has been doubled.

Harry L. Rodgers has taken a bond on the Iona group on Poreupine Creek, owned by Messrs. Price and Burgess.

The bondholders of the Summit group have decided to float a company to operate the property.

**Kaslo.**—At the Lucky Jim changes appear to have taken place in the grade of the ore as development work proceeded. The zinc zone has been worked through and an extensive body of silver-lead ore cut into.

## MINING NEWS OF THE WORLD.

### GREAT BRITAIN.

The Anthracite Miners' Association has demanded an increase of 5 per cent., on the ground of the high prices of anthracite compared with other coals. Should a strike take place, 12,000 men will be involved. The increase is over £60,000 a year.

On December 31st, 1908, there were 515 blast furnaces standing in Great Britain, of which 310 were in blast and 203 idle. This compares with previous quarters of 1908 as follows: March, 12 in blast; June, 308; September, 301. On December 31st there were five new furnaces under construction, and 70 being relined and repaired.

### RUSSIA.

A committee of the Gold and Platinum Miners' Association of Russia has been investigating the possibility of substitutes for platinum, and it reports that there is little likelihood of a substitute being found to take the place of platinum in most of its commercial uses.

Experiments are being made in Russia to produce briquettes, using naphtha as a binding material. Hitherto the difficulty in the way of producing briquettes in Russia has been the need for importing the tar requisite for binding the small coal.

Owing to the depression in the platinum mining industry the platinum miners have applied to the Russian Government, asking that the industry be upheld until it is definitely decided whether the mining of platinum is to be made a monopoly of the Russian Government.

### ROUMANIA.

The Roumanian Minister of Commerce has introduced a bill to authorize the leasing of petroliferous fields in the possession of the state. The fields are to be let in lots of 75 acres. Work to commence within six months from the granting of the concession, and two boreholes must be set up yearly.

### SOUTH AFRICA.

It is rumored that there has been an important reef discovery in the southern part of the Heidelberg district. The spot where the discovery was made is about 60 miles southeast of Johannesburg, and it is stated that investigations prove the

existence of this gold carrier over 12 farms. The reef in question is co-related to the main reef.

In 1907 the total applications of capital to South African mining enterprises was nearly a quarter of a million sterling. In the first three-quarters of 1908 these applications totalled nearly two millions sterling, and in the last quarter of the year they amounted to £865,000.

A discovery of tin is reported from Rhodesia, said to be the site of an ancient tin working. The ancient workers put a shaft down 12 feet, but a shaft recently put down 30 feet showed tin associated with iron and copper in chlorite schist. The formation is the same as the Herberton tin fields in Queensland.

At the present time there are four companies on the Rand which crush 50,000 tons of ore per month, whilst there are a number of plants with slightly less than this. According to the plans of some of the companies, in the near future these figures will be doubled or even trebled.

Over 25,000 tons of chrome ore, valued at about £68,000, having been already exported from Southern Rhodesia, it has been decided to proceed with the construction of a railway line from Selukwe to tap the chrome ore fields. This extension will considerably lessen the cost of transport of ore, and thereby give an increased impetus to mining operations in the Selukwe district.

### AUSTRALASIA.

Further trouble has occurred amongst the miners at Broken Hill. Five hundred men belonging to the Junction North Mine have gone on strike as the result of the dismissal of a unionist miner. Employees at other mines threaten to strike owing to the employment of non-unionists.

The New South Wales Minister for Education has established day schools at the technical colleges at Ultimo and Newcastle. They will provide training in engineering, mining, and architecture.

### UNITED STATES.

The farmers of Deer Lodge Valley, who have been in court actions with the Amalgamated Copper Co. in an effort to close the Washoe smelter at Anaconda, have abandoned the fight, and are now seeking to get a settlement with the company through arbitration or sale of their farms to the Amalgamated.

The Minnesota Senate has passed a bill placing a tax of about 5 cents per ton on iron ore mined in the State.

Copper stocks in the United States are estimated to exceed 182,000,000 pounds, which is 18 per cent. of the total annual production. The addition to this surplus during March amounted to 8,350,000 pounds, or 7.5 per cent. of the total monthly output. It is evident, therefore, that the stocks of marketable copper are not accumulating at an increasing rate.

## Company Notes.

### RIGHT OF WAY BONUS.

A bonus of 10 per cent. has been declared by the Right of Way Mining Co., payable May 20th, to stock of record May 15th.

### COAL AND COKE DIVIDEND.

The International Coal and Coke Co., Coleman, Alta., have declared a dividend of  $11\frac{1}{4}$  per cent. for the quarter, payable May 1st, to stockholders of record April 20.

### EXTRA BUFFALO DIVIDEND.

The Buffalo directors have declared an extra dividend of 3 per cent., payable May 15, to holders of record May 5. The Buffalo pays 5 per cent. a quarter and 1 per cent. extra a month. This 3 per cent. extra just declared is presumably for February, March and April.

### THE PACIFIC PASS COAL FIELDS, LIMITED.

A company has been formed in Montreal under the name of the Pacific Pass Coal Fields, Limited. The company's property consists of 30,000 acres, situated on the headwaters of the McLeod, Embarras and Pembina Rivers, about 40 miles from the main line of the G. T. P., in the Province of Alberta. It is held under a 21 years' lease from the Dominion Government,

renewable for another term of 21 years. The coal is bituminous of good quality. The measures lie almost horizontally, and practically all above water level, thus making the operations self-draining and capable of gravity haulage.

The company has a total outstanding bond issue of \$1,250,000 and an authorized capital of \$5,000,000, of which \$4,000,000 has been issued. The company will at first have a capacity of 750,000 tons of coal annually, for which there is already an assured market.

The Board of Directors is as follows: Mr. E. B. Greenshields, President; Hon. Robert Mackay, Vice-President; Mr. Wm. Molson Macpherson, John Theo. Ross, H. A. Lovett, K.C., R. Brutinel, Edmonton Mineralogist; A. H. Cook, K.C., A. de Bernis, J. W. McConnell and F. L. Wanklyn. Executive Committee—E. B. Greenshields, H. A. Lovett, K.C., J. W. McConnell. Secretary-Treasurer, R. P. Doucet.

### SILVER QUEEN HOLDS ANNUAL MEETING.

The Cobalt Silver Queen Mining Company held their annual meeting April 27th. No dividend was announced, the directors having decided to withhold dividends while the mine workings are in poor ore, as they are at present. The financial statement showed liabilities outside of capital stock (\$1,500,000) of \$14,223. Against this the mine, equipment, offices and assay laboratory are set down at \$1,465,836. Other assets are: Sundry debtors, including smelter certificates, power rental, etc., \$7,751; ore on hand and at smelters, \$13,000; dump (estimated), \$25,000, and cash \$2,633. The ore on hand and in transit and cash balance amounts to \$40,633.

At the end of the last financial year cash on hand amounted to \$54,861.51. With this balance and what the mine has produced the company has paid to shareholders \$195,000 in dividends, besides what has been spent in development work and in installing a new and larger plant. The new 12-drill compressor is producing more air than required, and the excess is sold, realizing \$1,000 a month. The Northern Customs concentrator will begin treating the dump of May 5th.

The Board of Directors is as follows:—Lieut.-Col. John I. Davidson, President; F. L. Culver, First Vice-President; R. W. Gordon, Second Vice-President; J. H. Stephens, General Manager and Secretary-Treasurer; A. J. Young, Director.

## STATISTICS AND RETURNS.

### DOMINION STEEL OUTPUT.

The Dominion Iron and Steel Company's output for eleven months ending April 30 shows as follows:—

|                | 1909.<br>tons. | 1908.<br>tons. |
|----------------|----------------|----------------|
| Pig iron ..... | 260,137        | 260,976        |
| Ingots .....   | 259,984        | 265,560        |
| Blooms .....   | 250,500        | 230,605        |
| Rails .....    | 123,830        | 144,108        |
| Rods .....     | 46,111         | 41,918         |

For the separate month of April the output was: Pig iron, 22,760 tons; ingots, 24,815 tons; blooms, 23,947 tons; rails, 12,836 tons; rods, 4,297 tons. Shipments for April were some 8,000 tons below March, which was the banner month in the company's history.

### APRIL OUTPUT, DOMINION COAL CO.

The output from the Dominion Coal Company's collieries last month amounted to 288,835 tons. This is the smallest April

output since 1905. Last month's output in detail was as follows:—

|                     |             |
|---------------------|-------------|
| Dominion No. 1..... | 51,240 tons |
| Dominion No. 2..... | 64,330 "    |
| Dominion No. 3..... | 24,407 "    |
| Dominion No. 4..... | 36,172 "    |
| Dominion No. 5..... | 45,851 "    |
| Dominion No. 6..... | 9,310 "     |
| Dominion No. 7..... | 14,762 "    |
| Dominion No. 8..... | 16,789 "    |
| Dominion No. 9..... | 25,974 "    |

|                 |           |
|-----------------|-----------|
| Total .....     | 288,835 " |
| Shipments ..... | 180,919 " |

### DOMINION COAL'S FOUR MONTHS' OUTPUT.

Dominion Coal's output for the first four months of the year is 946,000 tons, against 1,243,080 tons a year ago:—



|                    | 1909.   | 1908.     | 1907.     |
|--------------------|---------|-----------|-----------|
| January . . . . .  | 195,971 | 312,358   | 231,606   |
| February . . . . . | 206,970 | 283,358   | 225,716   |
| March . . . . .    | 251,585 | 344,129   | 310,220   |
| April . . . . .    | 291,934 | 303,249   | 316,384   |
| Totals . . . . .   | 946,570 | 1,243,094 | 1,083,926 |

#### NOVA SCOTIA STEEL AND COAL CO. OUTPUT.

The output of coal at the Nova Scotia Steel and Coal Company's collieries for the month of April was 500 tons greater than in the corresponding month last year. The output by the collieries was as follows:—

|                           |             |
|---------------------------|-------------|
| No. 1 . . . . .           | 20,540 tons |
| No. 2 . . . . .           | 4,011 "     |
| No. 3 . . . . .           | 20,637 "    |
| No. 4 . . . . .           | 2,522 "     |
| No. 5 . . . . .           | 12,011 "    |
| Total . . . . .           | 59,721 "    |
| Pig iron output . . . . . | 5,600 "     |
| Steel output . . . . .    | 6,600 "     |

#### CUMBERLAND COLLIERIES' OUTPUT.

Shipments for the month of April from the Cumberland Collieries, Springhill, were 34,435 tons.

#### COBALT ORE SHIPMENTS.

Following are the weekly shipments from the Cobalt camp, and those from Jan. 1, 1909, to date:—

|                         | Week ending<br>April 24. | Since<br>Jan. 1. |
|-------------------------|--------------------------|------------------|
|                         | Ore in lbs.              | Ore in lbs.      |
| Crown Reserve . . . . . | 121,843                  | 1,781,119        |
| Kerr Lake . . . . .     | 60,000                   | 483,442          |
| La Rose . . . . .       | 261,300                  | 4,456,518        |
| Nipissing . . . . .     | 321,272                  | 3,831,572        |
| O'Brien . . . . .       | 128,598                  | 589,918          |
| Right of Way . . . . .  | 128,102                  | 1,205,672        |
| Temiskaming . . . . .   | 60,000                   | 710,200          |

Ore shipments to April 24, 1909, are 17,942,970 pounds, or 8,971 tons. Total shipments for week ending April 24, 1,081,115 pounds, or 540 tons.

|                            | Week ending<br>May 1. | Since<br>Jan. 1. |
|----------------------------|-----------------------|------------------|
|                            | Ore in lbs.           | Ore in lbs.      |
| Buffalo . . . . .          | 44,620                | 384,640          |
| Coniagas . . . . .         | .....                 | 524,820          |
| Crown Reserve . . . . .    | .....                 | 1,781,119        |
| Cobalt Central . . . . .   | 43,270                | 248,515          |
| Chambers-Ferland . . . . . | 40,000                | 520,440          |
| City of Cobalt . . . . .   | .....                 | 688,522          |
| Kerr Lake . . . . .        | .....                 | 483,442          |
| King Edward . . . . .      | .....                 | 98,030           |
| La Rose . . . . .          | 234,500               | 4,691,018        |
| McKinley-Darragh . . . . . | 37,340                | 524,280          |
| Nipissing . . . . .        | 120,660               | 3,952,238        |
| Nova Scotia . . . . .      | .....                 | 480,810          |
| Nancy Helen . . . . .      | .....                 | 40,000           |

|                         |         |           |
|-------------------------|---------|-----------|
| Peterson Lake . . . . . | .....   | 132,960   |
| O'Brien . . . . .       | 128,018 | 717,936   |
| Right of Way . . . . .  | .....   | 1,205,672 |
| Silver Queen . . . . .  | .....   | 127,865   |
| Temiskaming . . . . .   | 132,800 | 843,200   |
| Trethewey . . . . .     | 191,988 | 845,538   |
| T. & H. B. . . . .      | .....   | 610,600   |
| Muggley Cone. . . . .   | .....   | 72,900    |

Ore shipments to May 1, 1909, are 18,956,166 pounds, or 9,478 tons. Total shipments for week ending May 1 are 1,013,196 pounds, or 507 tons.

#### COBALT ORE SHIPMENTS FOR THE MONTH OF APRIL.

|                            | Tons.  |
|----------------------------|--------|
| La Rose . . . . .          | 737.54 |
| Nipissing . . . . .        | 393.09 |
| Right of Way . . . . .     | 311.80 |
| Crown Reserve . . . . .    | 207.19 |
| O'Brien . . . . .          | 128.15 |
| Trethewey . . . . .        | 125.45 |
| Temiskaming . . . . .      | 122.69 |
| Kerr Lake . . . . .        | 62.45  |
| McKinley-Darragh . . . . . | 62.12  |
| Coniagas . . . . .         | 661.66 |
| T. & H. B. . . . .         | 60.10  |
| City of Cobalt . . . . .   | 53.82  |
| Chambers-Ferland . . . . . | 49.80  |
| Cobalt Central . . . . .   | 42.98  |
| Buffalo . . . . .          | 42.52  |
| Silver Queen . . . . .     | 31.45  |

Total . . . . . 2,492.81

The following table gives the total shipments for the month up to the end of April:—

|                    | Tons.    |
|--------------------|----------|
| January . . . . .  | 2,374.03 |
| February . . . . . | 2,113.93 |
| March . . . . .    | 2,477.90 |
| April . . . . .    | 2,492.83 |

Total . . . . . 9,456.68

For the corresponding four months of last year the camp shipped 5,650.01 tons.

#### BRITISH COLUMBIA ORE SHIPMENTS.

The following are the ore shipments for the week ending April 16th, and year to date:—

| Boundary—                       | Week.  | Year.   |
|---------------------------------|--------|---------|
| Granby . . . . .                | 16,687 | 284,461 |
| Mother Lode . . . . .           | 9,120  | 122,936 |
| Snowshoe . . . . .              | 2,506  | 33,360  |
| Other mines . . . . .           | .....  | 1,773   |
| Total . . . . .                 | 28,313 | 442,530 |
| Rossland—                       |        |         |
| Centre Star . . . . .           | 2,878  | 43,514  |
| Le Roi No. 2 . . . . .          | 691    | 9,146   |
| Le Roi No. 2 (milled) . . . . . | 260    | 3,740   |
| Other mines . . . . .           | .....  | 9,393   |
| Total . . . . .                 | 3,829  | 65,793  |

|                              |        |         |  |
|------------------------------|--------|---------|--|
| Slocan-Kootenay—             |        |         |  |
| Total . . . . .              | 3,790  | 52,784  |  |
| Grand total . . . . .        | 35,932 | 561,109 |  |
| <b>Smelter Receipts.</b>     |        |         |  |
|                              | Week.  | Year.   |  |
| Grand Forks . . . . .        | 16,687 | 284,671 |  |
| Greenwood . . . . .          | 9,120  | 124,419 |  |
| Trail . . . . .              | 7,270  | 101,351 |  |
| Northport (Le Roi) . . . . . |        | 12,761  |  |
| Total . . . . .              | 33,077 | 523,202 |  |

The following are the ore shipments for the week ending April 23rd and year to date in tons:—

|                                 |  |        |         |
|---------------------------------|--|--------|---------|
| Boundary—                       |  | Week.  | Year.   |
| Granby . . . . .                |  | 16,010 | 290,471 |
| Mother Lode . . . . .           |  | 8,946  | 132,882 |
| Snowshoe . . . . .              |  | 2,182  | 34,542  |
| Other mines . . . . .           |  |        | 1,793   |
| Total . . . . .                 |  | 27,138 | 458,688 |
| Rossland—                       |  |        |         |
| Centre Star . . . . .           |  | 4,077  | 47,591  |
| Le Roi No. 2 . . . . .          |  | 711    | 9,857   |
| Le Roi . . . . .                |  | 29     | 20      |
| Le Roi No. 2 (milled) . . . . . |  | 260    | 9,000   |
| Other mines . . . . .           |  |        | 9,393   |
| Total . . . . .                 |  | 5,068  | 75,861  |

|                       |        |         |  |
|-----------------------|--------|---------|--|
| Slocan-Kootenay—      |        |         |  |
| Total . . . . .       | 3,405  | 56,289  |  |
| Grand total . . . . . | 35,611 | 590,838 |  |

#### Smelter Receipts.

|                       |        |         |
|-----------------------|--------|---------|
|                       | Week.  | Year.   |
| Northport . . . . .   |        | 12,761  |
| Grand Forks . . . . . | 16,010 | 290,681 |
| Greenwood . . . . .   | 8,946  | 133,365 |
| Trail . . . . .       | 7,800  | 109,151 |
| Total . . . . .       | 32,756 | 545,958 |

#### CONS. MINING AND SMELTING OUTPUT.

Statistical statement of the Consolidated Mining and Smelting Company's Trail smelter, for the month of March, 1909:—

|                       |           |              |                    |
|-----------------------|-----------|--------------|--------------------|
|                       | March.    | Nine Months. |                    |
|                       | Tons.     | Tons.        |                    |
| Ore received—         |           |              |                    |
| Company's mines . .   | 26,865    | 223,416      |                    |
| Other mines . . . . . | 5,566     | 55,664       |                    |
| Total ore received    | 32,431    | 279,080      |                    |
| Ore smelted—          |           |              |                    |
| Copper furnaces . .   | 26,590    | 223,096      |                    |
| Lead furnaces . . .   | 5,689     | 45,237       |                    |
|                       | 32,279    | 268,333      |                    |
| Metals produced—      |           |              |                    |
| Gold, oz. . . . .     | 8,795     | \$180,298    | 73,445 \$1,505,623 |
| Silver, oz. . . . .   | 185,796   | 94,596       | 1,601,263 819,017  |
| Copper, lbs. . . . .  | 354,110   | 43,772       | 3,179,674 436,457  |
| Lead, lbs. . . . .    | 4,158,481 | 120,554      | 28,215,407 820,775 |
| Total gross value     | \$439,220 |              | \$3,581,872        |

|                           |        |              |
|---------------------------|--------|--------------|
|                           | March. | Nine Months. |
|                           | p.c.   | p.c.         |
| Value of gold . . . . .   | 42.05  | 42.03        |
| Value of silver . . . . . | 21.54  | 22.87        |
| Value of copper . . . . . | 9.96   | 12.18        |
| Value of lead . . . . .   | 27.45  | 22.92        |
|                           | 100    | 100          |

#### RAND GOLD OUTPUT.

The Rand gold output for April is estimated in London at 600,000 ounces, or 7,500 ounces less than March, being the smallest output, excepting the short month of February, since last September. Comparison of values is as follows:—

|                          |              |
|--------------------------|--------------|
| April, 1908 . . . . .    | \$12,017,000 |
| March, 1909 . . . . .    | 12,902,000   |
| February, 1909 . . . . . | 12,004,000   |
| January, 1909 . . . . .  | 13,064,000   |
| December, 1909 . . . . . | 14,031,000   |
| April, 1907 . . . . .    | 11,405,000   |
| April, 1906 . . . . .    | 9,329,000    |
| April, 1905 . . . . .    | 8,475,000    |
| April, 1904 . . . . .    | 6,497,000    |

#### MARKET REPORTS.

##### Silver Prices.

|                    |           |          |
|--------------------|-----------|----------|
|                    | New York. | London.  |
|                    | cents.    | pence.   |
| April 16 . . . . . | 51 3/4    | 23 5/8   |
| " 17 . . . . .     | 51 3/4    | 23 9-16  |
| " 19 . . . . .     | —         | —        |
| " 20 . . . . .     | 51 1/2    | 23 11-16 |
| " 21 . . . . .     | 51 7/8    | 23 7/8   |
| " 22 . . . . .     | 51 3/4    | 23 3-16  |
| " 23 . . . . .     | 52 1/4    | 24 1-16  |
| " 24 . . . . .     | 52 1/8    | 24       |
| " 26 . . . . .     | 52 1/8    | 23 15-16 |
| " 27 . . . . .     | 52 3/8    | 24 1/8   |
| " 28 . . . . .     | 52 3/8    | 24 1/8   |
| " 29 . . . . .     | 52 7/8    | 24 3/8   |
| " 30 . . . . .     | 53        | 24 7-16  |
| May 1 . . . . .    | 52 3/4    | 24 5-16  |
| " 3 . . . . .      | 52 7/8    | 24 3/8   |
| " 4 . . . . .      | 53 3/8    | 24 11-16 |

#### MARKET REPORTS.

May 4.—Connellsville coke, f.o.b., ovens:—  
Furnace coke, prompt, \$1.40 to \$1.50.  
Foundry coke, prompt, \$1.80 to \$2.00.

##### Metals.

May 4.—Tin, Straits, 28.95 cents.  
Copper, prime Lake, 13 cents.  
Electrolytic copper, 12.70 cents.  
Copper wire, 14.25 cents.  
Lead, 4.20 to 4.22 1/2 cents.  
Spelter, 5.02 1/2 cents.  
Antimony, Cookson's, 8.25 cents.  
Aluminium, 22 to 24 cents.  
Nickel, 40 to 47 cents.  
Bismuth, \$1.75 per lb.  
Platinum, \$22.50 to \$23.50 per ounce.  
Quicksilver, \$44.50 to \$45.00 per 75 lb. flask.



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5 Second Hand Locomotive Type Boilers, 150 H. P., 125 lbs. working pressure.

2 Second Hand Ingersoll Sergeant Class A straight line Air Compressors; Steam Cylinders 24" dia.; air cylinders 26 1/4" dia.; 30" stroke.

1 Second Hand Ingersoll Sergeant Class G Duplex Air Compressor; Steam Cylinders 18" dia.; L. P. Air Cylinders 28 1/4" dia.; H. P. Air Cylinders 17 1/4" dia.; 24" stroke.

1 Second Hand Four Wheel Saddle Tank Locomotive, 42" gauge, cylinders 10" x 14"; weight 14 tons.

4 Second Hand Jeffrey 10-ton Electric Mine Locomotives, gauge 36", 75 H. P.

1 New Aldrich-Westinghouse Portable Electric Mine Pump mounted, 36 gauge; capacity 100 gals.; 300' lift; 10 H. P., 220 volts D. C. Enclosed Motor.

1 Second Hand Danville Tail Rope Haulage Plant, Hoist 4 drums 88" dia., Double engines, Cylinders 20" x 36"

1 Second Hand Danville Endless Rope Haulage Plant, Hoist 2 drums 60" dia., Double Engines, Cylinders 10" x 18".

2 Second Hand Crocker Wheeler D. C. Generators 125 V, 200 Amp. 25 K. W.

1 Second Hand Marble Switch Board complete with Ammeters and volt meters.

1 Second Hand 80 H. P. McEwing High Speed Horizontal Engine.

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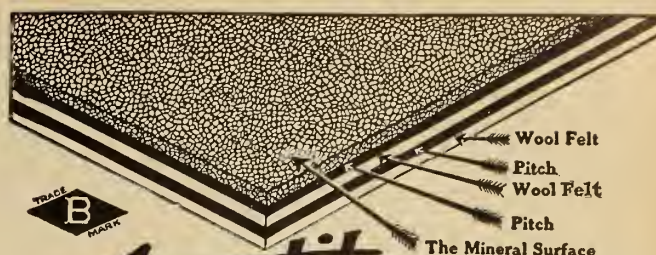
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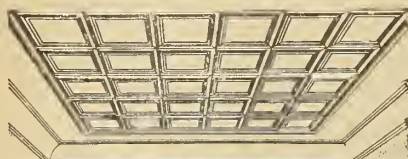
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| <p>1017. Summary Report, Department of Mines, Geological Survey, for 1907.</p> <p>982. Report on a Portion of Conrad and Whitehorse Mining District, Yukon, by D. D. Cairns.</p> <p>996. Preliminary Report on a Portion of the Main Coast of British Columbia and Adjacent Islands, including New Westminster and Nanaimo District, by O. E. Leroy.</p> <p>988. Report on Telkwa and Vicinity, British Columbia, by W. W. Leach.</p> <p>986. Preliminary Report on a Portion of the Similkameen District, British Columbia, by Charles Camsell.</p> <p>968. Report on Moose Mountain District of Southern Alberta, by D. D. Cairns.</p> <p>992. Report on a Portion of Northwestern Ontario traversed by the National Transcontinental Railway between Lake Nipigon and Sturgeon Lake, Ontario, by W. H. Collins.</p> | <p>962. Second Edition of a Report on the Geology and Natural Resources of the Area included in the Nipissing and Timiskaming Map Sheets, by A. E. Barlow.</p> <p>961. Reprint of a Report on the Origin, Geological Relations and Composition of the Nickel and Copper Deposits of the Sudbury Mining District, by A. E. Barlow.</p> <p>1028. Report on a Recent Discovery of Gold near Lake Megantic, Quebec, by J. A. Dresser.</p> <p>983. The Geology and Mineral Resources of New Brunswick, by R. W. Ellis.</p> <p>1021. Explorations in Nova Scotia, Summary Report by Hugh Fletcher.</p> <p>Map No. 71, St. Margaret Bay Sheet, by E. R. Faribault.</p> <p>Map No. 70, Aspotogan Sheet, by E. R. Faribault.</p> <p>Map No. 68, City of Halifax Sheet, by E. R. Faribault.</p> |
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When answering Advertisements please mention THE CANADIAN MINING JOURNAL.



# The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch. If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertisers kindly mention this Journal.

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Sullivan Machinery Co.  
Walker Bros., Limited.  
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John McDougall Caledonia Iron Works.  
Peacock Bros.  
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A. R. Williams Machinery Co.  
Link Belt Co.  
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Link Belt Co.  
A. M. Ellicott Co.
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Jenckes Machine Co., Ltd.  
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Chemists' & Surgeons' Supply Co.  
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Mussens, Ltd.
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B. Greening & Co.  
Link Belt Co.  
Waterous Engine Works.
- Conveying Machinery—**  
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Cumberland Railway & Coal Co.  
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Link Belt Co.  
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Laurie & Lamb.
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Waterous Engine Works.
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A. R. Williams Machinery Co.  
Mussens, Ltd.
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# MONTREAL STEEL WORKS, LIMITED,

P.O. BOX  
2369 Montreal

Manufacturers of

**Steel Castings**

(Acid Open Hearth System)

**Switches and Track Work**

for Steam and Electric Roads

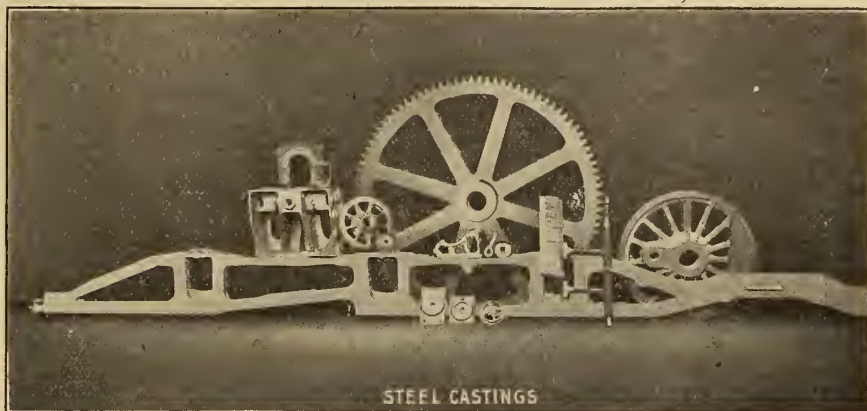
**Springs**

of all kinds

**Manganese Steel Castings**

for wearing Parts, insuring Great  
Hardness and Durability

**INTERLOCKING PLANTS  
TRUCKS FOR ELECTRIC CARS**



AGENTS FOR CANADA FOR

**THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND**

'Speedicut' High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

**BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND**

Quotations for Tee Rails, Fish Plates, etc., promptly furnished.

Catalogues sent on application.

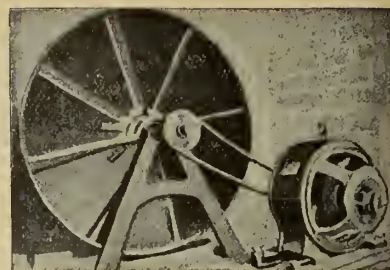
## "FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

**General Passenger Department, Intercolonial Railway**  
**MONCTON, N.B.**

# Westinghouse Motors for Mine Work



Westinghouse Motor Driving Ventilating Fan.

**Electric Power has many  
advantages for Mine Work**

It is the most adaptable and easy controlled. Apparatus can be installed exactly where wanted and be operated from any convenient central point. Wires may be strung anywhere.

## Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg.,  
TORONTO.  
439 Pender Street,  
VANCOUVER.

For particulars address nearest office:  
HAMILTON.  
922-923 Union Bank Bldg.,  
WINNIPEG.

252 St. James Street,  
MONTREAL.  
158 Granville Street,  
HALIFAX.

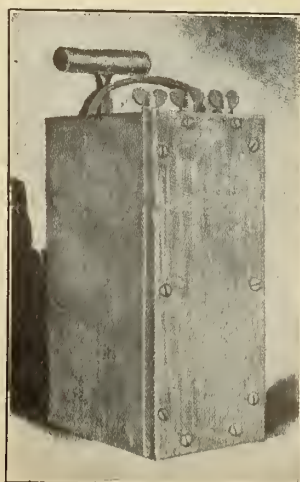
# HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and  
Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other  
Accessories.



Three Post Magneto Electric Blasting Machine

## NOBEL GELIGNITE A New High Explosive

It always breaks cleanly to the bottom of the drill holes.  
and is free from fumes of any kind,

A letter or telegram addressed to the head office or any of the following  
agencies will receive prompt attention.

COBALT      TORONTO      KENORA      SAULT STE. MARIE  
VICTORIA, B.C.      VANCOUVER, B.C.      CALGARY      NELSON, B.C.

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THE  
FINEST MINERS' TOOLS  
ARE  
"HARDY'S"

INTERCHANGEABLE

"Universal" Picks

They cut more Coal in less Time than any others  
and last longer

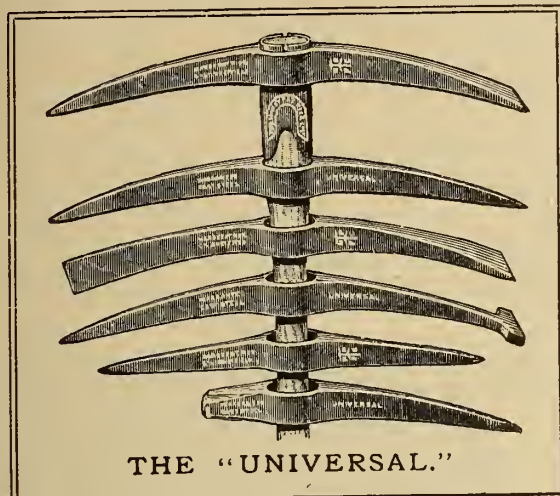
SHEFFIELD STEEL THROUGHOUT

"ELLIOTT" & "RATCHET"

POST and BARREL

BORING MACHINES

For HAND POWER, for ROCK and COAL  
Fitted with Quick-Change Nuts and Automatic Feed



THE "UNIVERSAL."

The HARDY PATENT PICK CO., Ltd.  
— SHEFFIELD, ENGLAND —

Stocks of our Universal Picks and Headed Shafts kept by Messrs. Mussels Ltd.,  
299 St. James Street, Montreal.

The "CLEVELAND"  
A One-Man Stope Drill

If you are doing any stoping or up-raising it will pay you to use a "Cleveland." To prove this we will ship you an equipment complete so that you can prove to your own satisfaction that it

**SAVES TIME, LABOR,  
POWER and POWDER**

We offer you a simple, durable, "fool-proof" machine which we will guarantee will do more work than any similar machine on the market at less cost for maintenance.

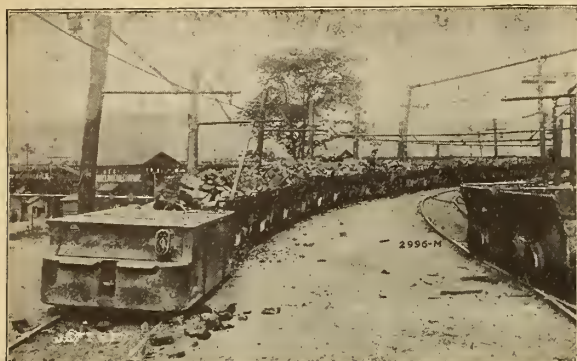
WRITE TODAY FOR BULLETIN NO. 40.

The Canadian Cleveland Drill Co., Ltd.  
Cobalt, Ontario.

ROCK DRILLS, PNEUMATIC TOOLS, HOSE, DRILL STEEL, ETC.

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## JEFFREY Electric Locomotives Coal Cutters and Rotary Drills

constitute an essential feature in every Coal Mine where modern, serviceable and economical machinery is required.

### Jeffrey Wire Cable Car Hauls

combine qualities which make them the most successful medium used for the continuous haulage of mine cars. Descriptive Bulletin X21.

WE BUILD

Complete Coal Mine and Tipple Equipments

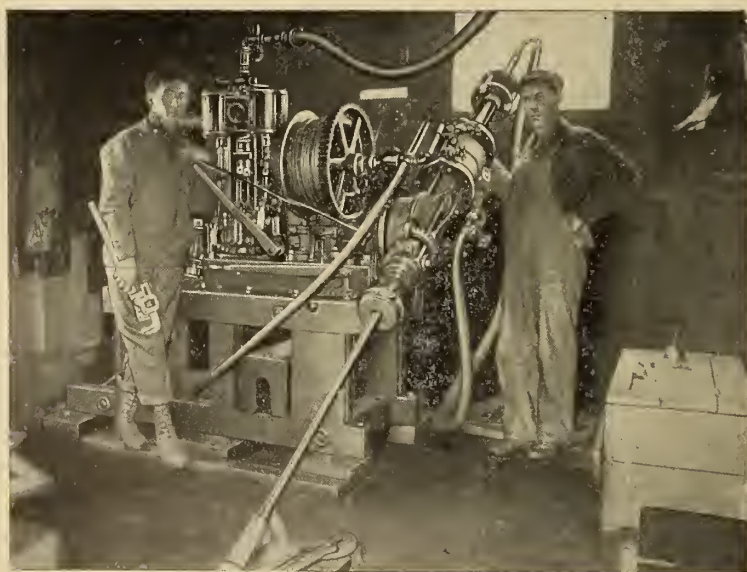
## The Jeffrey Mfg. Company

COLUMBUS, OHIO, U.S.A.

Canadian Office and Works - - - Montreal

The following bulletins will be mailed on request :

LOCOMOTIVES X15, DRILLS X16,  
COAL CUTTERS X14.



This cut shows a Sullivan Diamond Drill at work on a 45 degree hole in Northern Michigan. Diamond Drills are the only prospecting drills which can remove cores at any desired angle.

## The Deepest Hole

ever bored with a core drill in the United States was recently finished at Bisbee, Arizona, at a depth of **3,200** feet.

This work was done with a Sullivan Hydraulic Feed Diamond Drill and required one year (working single shift) for its completion. The hole was found to be absolutely vertical, without deviation.

**CATALOGUE 655.**

Rock Drills Air Compressors Hoists Diamond Drills

# SULLIVAN MACHINERY CO.

Birmingham, Ala.  
Butte, Mont.  
Claremont, N. H.  
Cobalt, Ont.

El Paso  
Denver, Colo.  
Joplin, Mo.  
Knoxville

RAILWAY EXCHANGE  
CHICAGO, ILL.

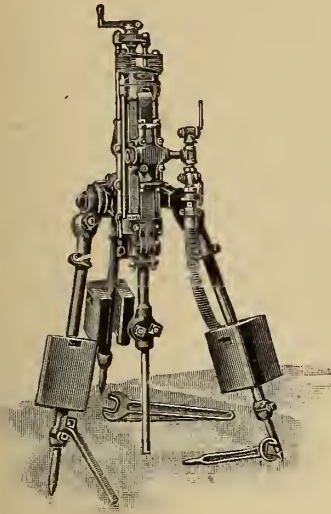
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Paris, France  
Pittsburg  
Rosland

Salt Lake  
San Francisco  
Seattle  
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# Rock Drills, Compressors, Boilers, Hoists



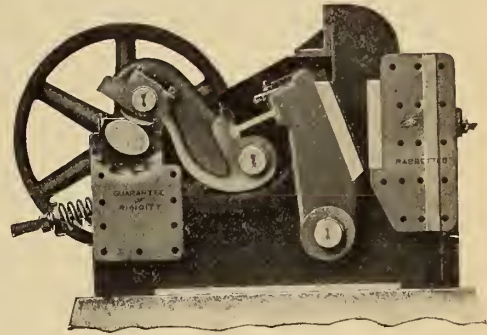
all carried in stock in  
Toronto

Agents for

STURTEVANT MILL CO'S

Crushing, Grinding,  
Pulverizing and  
Screening Machinery

Write us for Catalogue



## The A. R. Williams Machinery Co., Limited

Head Office: TORONTO, Branches: MONTREAL, WINNIPEG, VANCOUVER.

Manufacturers, Importers, and Dealers in all kinds of Engines, Boilers, Machinery and Supplies.



# RAND

"Little Giant"

## Rock Drills

☐ Built in sizes ranging from 2" to 5½" Cylinder diameter, for all work from boulder breaking to submarine drilling.

☐ Our claim that the Rand drill is the best in the market is proven by the sale of more of this type than of all other makes combined.

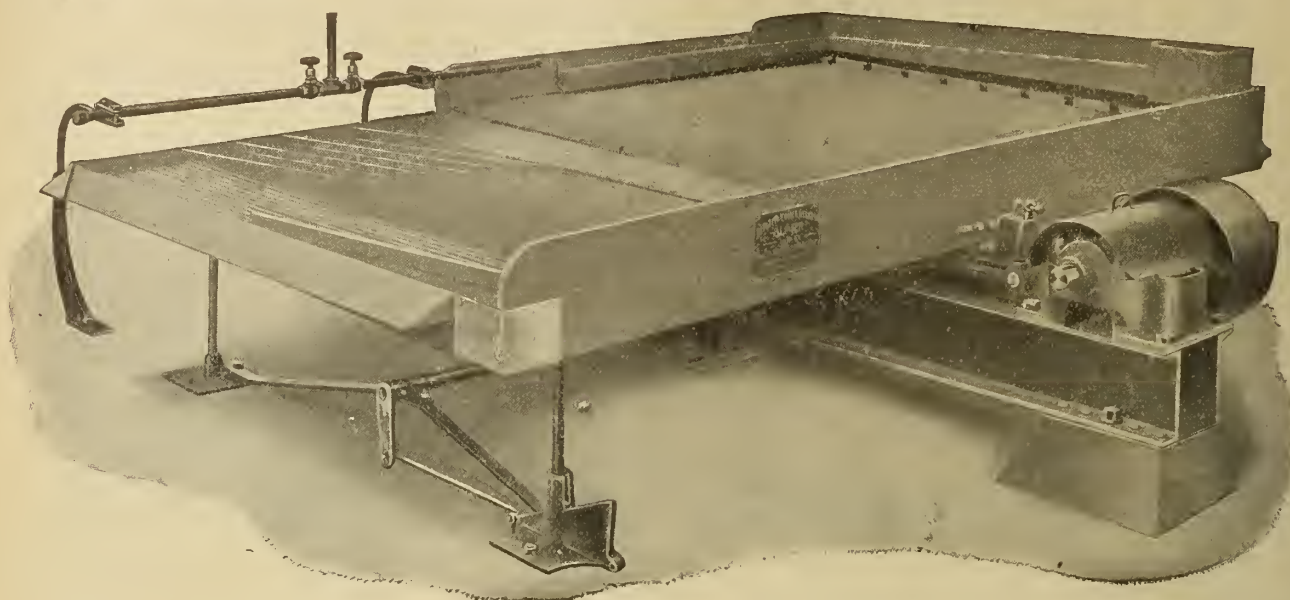
☐ Prices and catalog on request, or ask to have one of our representatives call.

## CANADIAN RAND CO., LIMITED

Montreal, Canada

TORONTO, COBALT, HALIFAX, WINNIPEG, ROSSLAND, MONTREAL.

## The No. 3 Deister Slime Table



The greatest advance in slime concentration attained in recent years has been accomplished by this table. Its success is emphasized by the fact that as the result of an elaborate competitive test with vanners of various makes **70 of these Tables are now in operation in the new mill of the Goldfield Consolidated Mines Co., Goldfield, Nevada**

This should draw the attention of all mill men. Send for Nos. 1, 2, and 3 Catalogues.

**Emil Deister, - - Fort Wayne, Indiana**

## The Canadian Bank of Commerce

HEAD OFFICE: - - - - - TORONTO

ESTABLISHED, 1867

B. E. WALKER, President A. LAIRD, General Manager

PAID-UP CAPITAL \$10,000,000 REST \$6,000,000

### TRAVELLERS' CHEQUES

The new Travellers' Cheques recently issued by this Bank are a most convenient form in which to carry money when travelling. They are issued in denominations of

**\$10, \$20, \$50, \$100 and \$200**

and the exact amount payable in **Austria, Belgium, Denmark, France, Germany, Great Britain, Holland, Italy, Norway, Russia, Sweden and Switzerland** is stated on the face of each cheque, while in other countries they are payable at current rates.

The cheques and all information regarding them may be obtained at every office of the Bank.

Branches at **Cobalt, Elk Lake, Cowganda, and Latchford** in the silver mining camp of New Ontario and throughout Canada; also in the United States and England.

## The Canadian Laboratories

Chemical and Physical tests  
of all Materials.

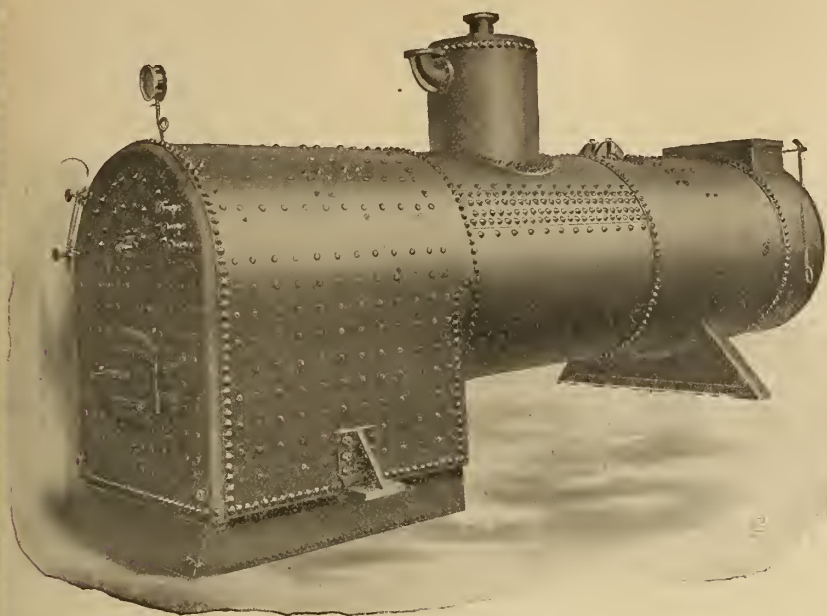
Mining properties examined  
and reported upon.

Write for prices for  
Ore analysis.

**37 Melinda St. Toronto**

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# BOILERS

Locomotive Portable  
Clyde Marine  
Square Fire Box Marine  
Vertical  
Return Tubular  
Water Tube

ASK FOR OUR LIST OF  
BOILERS ON STOCK WITH  
PRICES

**THE GOLDIE & McCULLOCH CO., LIMITED**  
GALT, - ONTARIO, - CANADA

WESTERN BRANCH  
248 McDermott Ave., Winnipeg, Man.

QUEBEC AGENTS  
Ross & Greig, Montreal, Que.

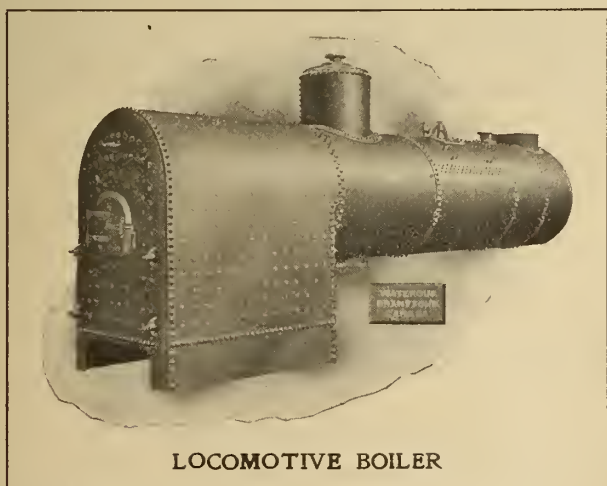
B.C. AGENTS  
Robt. Hamilton & Co., Vancouver, B.C.

WE MAKE Wheelock Engines, Corliss Engines, Ideal Engines, Piston Valve Saw Mill Engines, Boilers, Heaters, Tanks, Steam and Power Pumps, Condensers, Flour Mill Machinery, Oatmeal Mill Machinery, Wood-Working Machinery, Transmission and Elevating Machinery, Safes, Vaults and Vault Doors.

Ask for Catalogues, Prices and all Information.

## Locomotive and Stationary Tubular Boilers

IN STOCK—FOR IMMEDIATE SHIPMENT



LOCOMOTIVE BOILER

Inquiries Solicited.

## LOCOMOTIVE

30—40—50—60 H. P.

## TUBULAR BOILERS

72" x 18'—66" x 16'—60" x 14'—48" x 14'

1 HOISTING ENGINE, double cylinder, double drum, only used two weeks, thoroughly overhauled, cheap.

SHEET IRON and TANK WORK, AIR RECEIVERS, HEATERS, ENGINES, ROCK CRUSHERS, Etc.

**THE WATEROUS ENGINE WORKS CO., LTD.**

Western Branch:  
WINNIPEG, MAN.

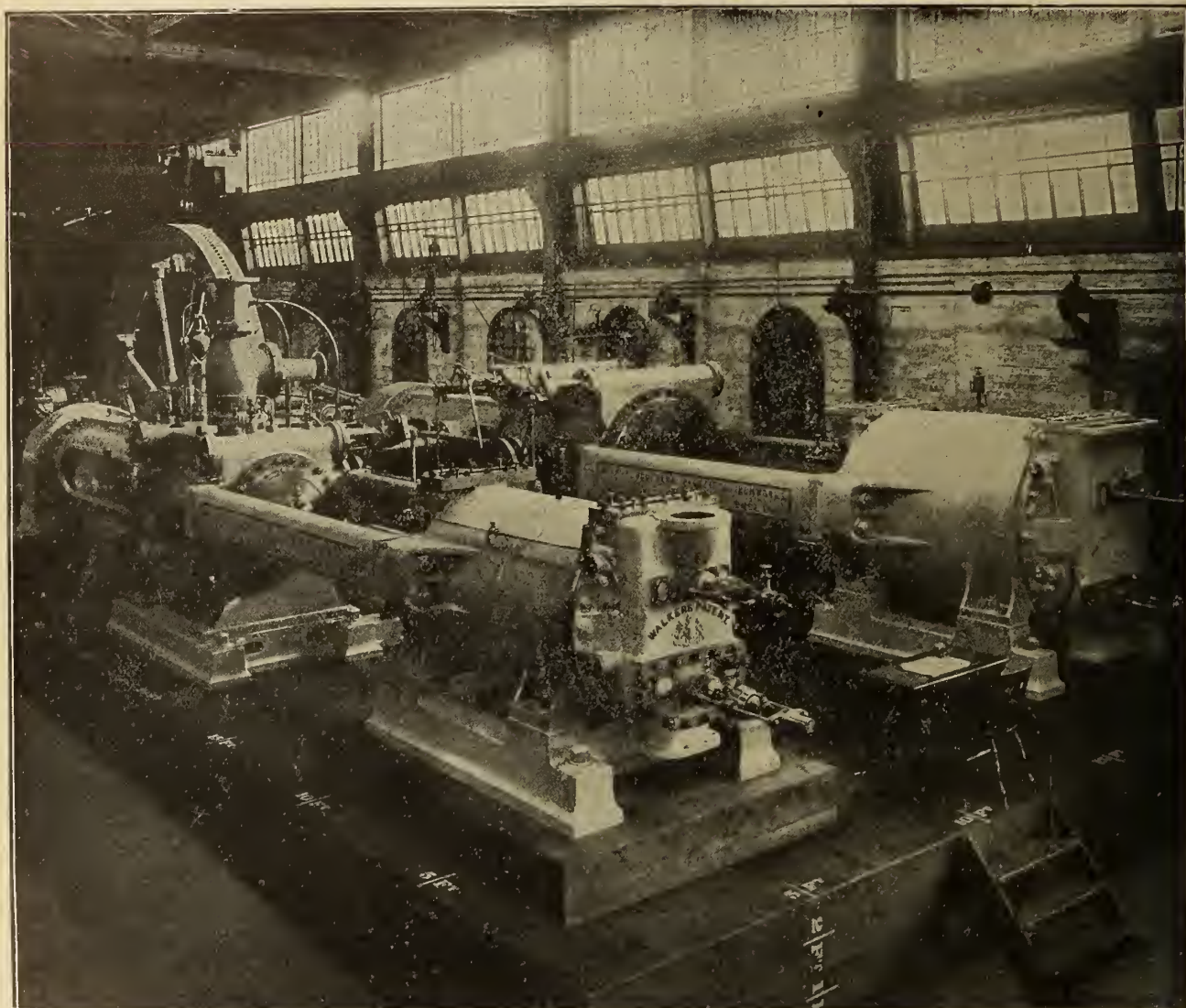
Brantford, Canada

B. C. Selling Agent:  
H. B. GILMOUR, VANCOUVER



# Walker Brothers (Wigan) Limited

## Wigan, England



## Largest Air Compressors in Canada

are of **WALKER BROTHERS (Wigan) LIMITED** manufacture.

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES**.

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Dominion Iron & Steel Company, Limited

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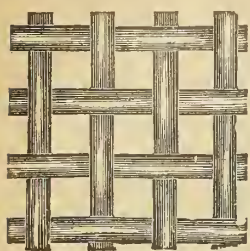
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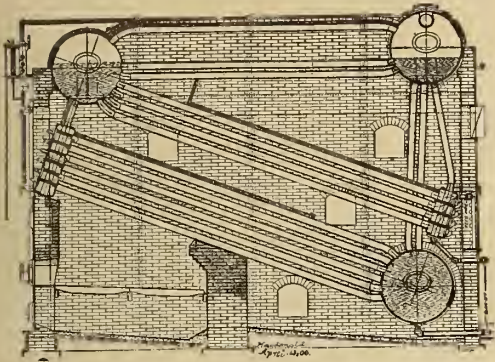
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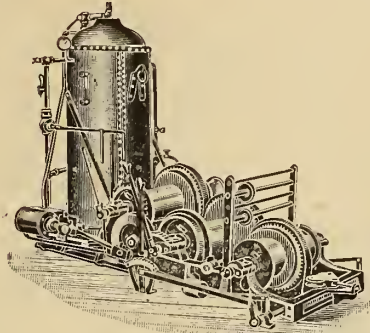
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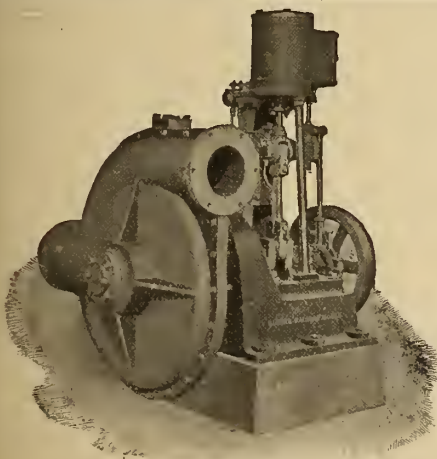
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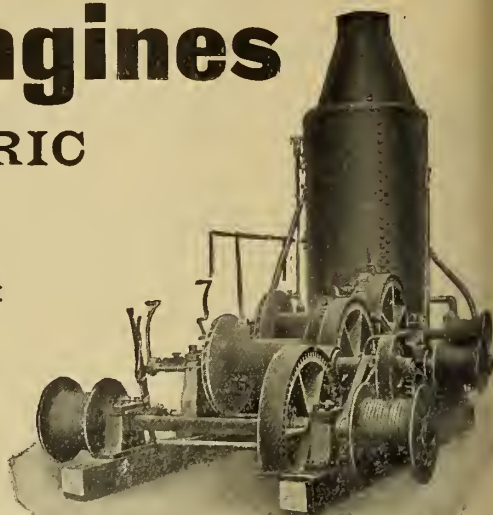
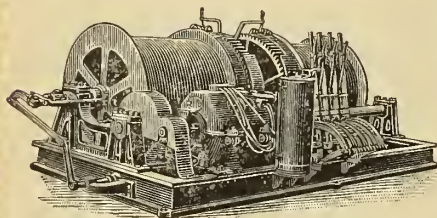
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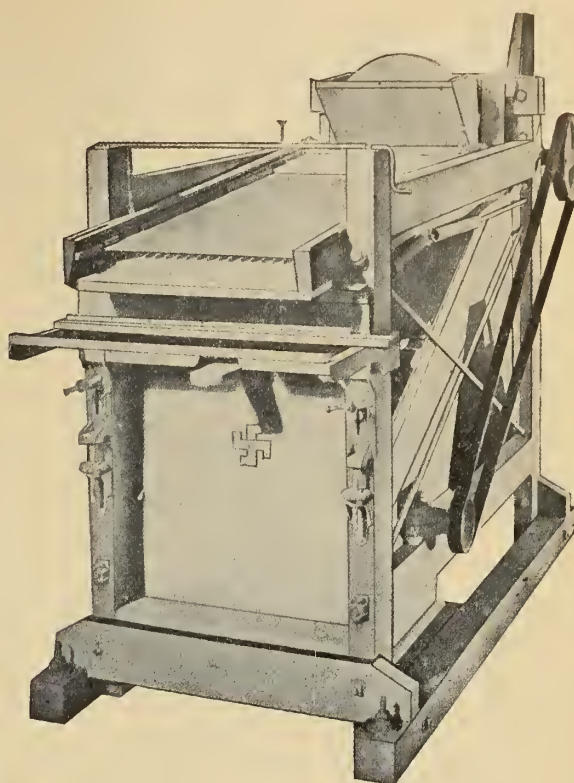
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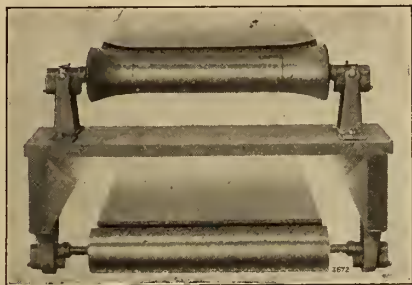
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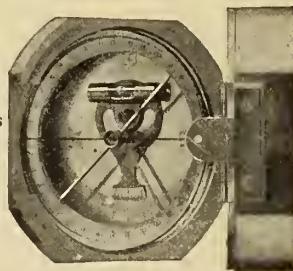
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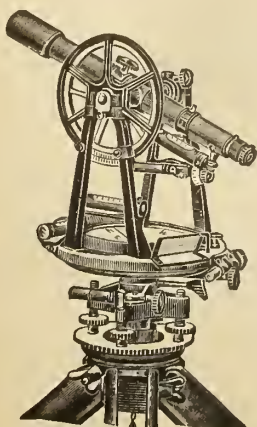
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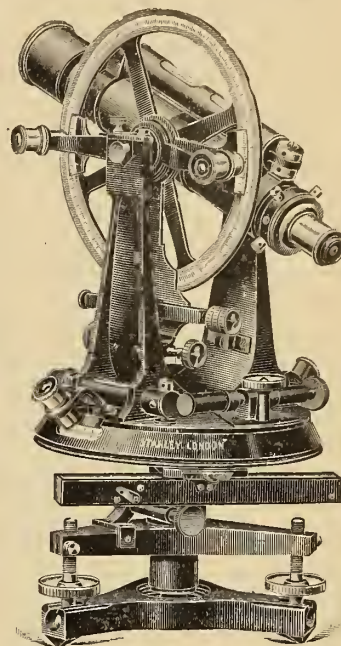
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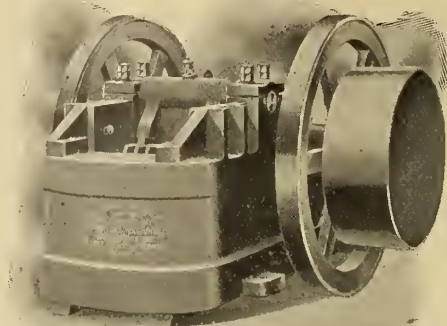
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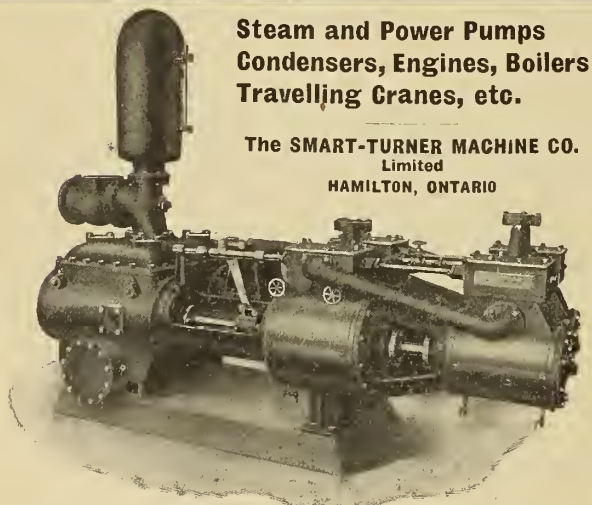
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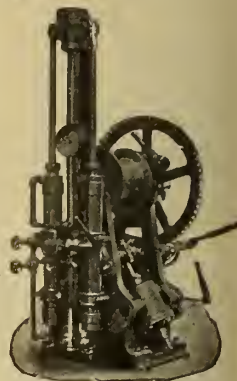
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, June 1, 1909

No. 11

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

**MINES PUBLISHING CO., LIMITED**

*Head Office* . . . Confederation Life Building, Toronto.

*Branch Offices* Montreal, Halifax, Victoria, and London, Eng.

*Editor:*

J. C. MURRAY, B.A., B.Sc.

**SUBSCRIPTIONS**—Payable in advance, \$2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, \$3.00 a year.

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### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

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### GOVERNMENT ASSISTANCE FOR NOVA SCOTIAN GOLD MINES.

In the last hours of the recent session of the Legislature of Nova Scotia an important measure became law. The 25th day of April, 1909, should henceforth be memorable, for on that date an Act was passed authorizing the Governor-in-Council to assist in further development of gold mines, and to give aid towards the development of water power in order to reduce the cost of gold mining in the Province.

The Act, officially entitled "An Act for the further assisting of the Gold Mining Industry," consists of five short sections. The first of these sections empowers the Governor-in-Council to give reasonable assistance in the operations of cross-cutting at such depths and for such distances as may be approved by the Inspector of Mines or an engineer selected by the Department of Mines.

The second section authorizes the Governor-in-Council to utilize such water-powers as may reduce the cost of gold mining in Nova Scotia. This is subject to the approval of the Inspector of Mines, or of an engineer selected by the Department of Mines.

The third section empowers the Governor-in-Council to refer the location of shafts, winzes, cross-cuts and levels to the approval of the Inspector of Mines, or to the approval of an engineer selected by the Department of Mines.

The fourth section intimates that payments are to be made on the monthly progress reports made by the Inspector of Mines, or by an engineer selected by the Department of Mines.

The fifth, and last, section provides that any individual, company, or association; receiving assistance under this Act shall pay the Government a royalty on all gold ore from the property or mines upon it in respect to which Government money has been expended, the sum of three per cent. on the gross amount of such gold so won, and such royalty shall continue to be paid by such individual, company or association, until the full amount advanced by the Government has been repaid. All such loans made, or assistance given, shall not be a charge against the property, company, individual, or association, but against the gold won from such property receiving assistance under this Act.

This, then, is the tenor of the Act that is designed to revivify gold mining in Nova Scotia. Its provisions, undoubtedly, are broad and wise. The Act itself is succinct and definite. But the miner who takes advantage of its provisions will find himself at the mercy of those who must interpret the Act. Even at the worst, there is ample encouragement left for the prospector and the casual miner. In its constructive phases the

new Act is a wonderful and almost unique encouragement to outside investors. All Canada will rejoice if Nova Scotia progresses in proportion to her resources.

### CONCENTRATING AND SMELTING COBALT ORES.

The annual report of Mr. A. A. Cole, mining engineer to the Temiskaming and Northern Ontario Railway Commission, has just been received. An abstract of this instructive pamphlet appears elsewhere in this issue. It will be noticed that detailed information concerning smelting rates has been gathered by Mr. Cole. One or two points call for notice.

During the year 1908, ten reduction companies treated ores from Cobalt. Four of these were Canadian concerns. To these four smelters 7,401.14 tons of high-grade ore were shipped. This quantity was equivalent to 29.18 per cent. of the total tonnage of the camp. In value the ore treated in Canada largely exceeded that of all the ore shipped out of the country. The great bulk of foreign shipments were low-grade.

Comparison of Canadian with foreign tariff rates does not reflect unfavorably upon the former. The most liberal smelting tariff is that of a Canadian enterprise. Apparently the metallurgical methods (carefully guarded secrets) of our own smelters are quite as effective as those of other countries.

This is all very satisfactory. But is there any just and sufficient reason why all the ore that comes from Cobalt should not be smelted in Canada?

Six concentrating mills are now in operation in Cobalt. Four more are under construction and will be running before the end of the current year. The flow-sheets of the mills that are now working indicate that the methods of comminution and preliminary concentration are becoming standardized. In three of these plants crushers, rolls, trommels, and jigs constitute the first four units. In five plants jigs are installed. In three mills (not including the McKinley-Darragh, which is nearing completion) stamps follow the jigs. Only one flow-sheet includes the Chilian mill.

It would appear that the probable arrangement of units in mills yet to be designed will conform to the following scheme: Crushers, rolls, trommels, jigs, stamps. The treatment of the stamp products after classification will always vary within certain limits. The choice of tables for sands and slimes depends largely upon the experience and predilections of the mill superintendent.

Two tube mills and one cyanide plant are in use. The future will see a large increase in these units.

### THE EIGHT HOURS DAY.

English, Welsh, and Scotch colliery operators are looking forward with misgivings to July 1st, the day on which the coal miners' Eight Hours Act becomes operative. The operators believe that an immediate

reduction in output will be the first effect of this limitation of working hours below ground. They contend that this reduction will amount to at least 10 per cent. and, in many instances, 20 per cent. The argument advanced by the supporters of the Act, to the effect that shorter hours will inspire the miners to keener and more continuous effort, is met by the assertion that in a vast majority of the collieries a maximum of work is already obtained and that, in any case, the miners' expenditure of energy cannot be intensified by an Act of Parliament.

The extent to which existing plants will require to be modified in order to meet the demand for speedier haulage, winding, and coal-winning, is a serious question. It appears probable that not a few mines, especially those whose equipment is antiquated, will not survive the change.

One clause of the Act is to be a storm centre. Section 3, clause 1, permits an addition of one hour to the working day on sixty days of the year. The questions as to how these nine-hour days are to be distributed, and as to whether the extra hour will be considered as overtime or not, have yet to be discussed.

Meanwhile the Miners' Federation has declared itself ready to fight to the last ditch against any reduction in wages.

As July 1 approaches, new difficulties crop up with disturbing rapidity. The most encouraging feature of the situation is the fact that the leaders of the Miners' Federation are capable and earnest men, not mere demagogues. Moreover, in Great Britain, as in most other parts of the British Empire, arbitration is becoming a habit.

We shall venture upon no prophecy. But we shall await, not without trepidation, the introduction of the eight hours day.

### PETROLEUM AND OILS.

Mr. Eugene Coste has constituted himself champion of the inorganic origin of petroleum. This implies not a small amount of moral courage. But Mr. Coste is courageous if nothing else.

Somehow we are led to believe that there may be a faint adumbration of truth in what Mr. Coste tells us. This is rank heresy; we only talk it in confidence. But it is obvious to the amateur that all advocates of the organic origin of petroleum must be apologists. Mr. Coste is not an apologist. He is an out and out enthusiast. His facts and arguments are set forth in battle array. He is afraid of no man.

### GOLD MINING IN RHODESIA IN 1908.

Fourteen years ago, Rhodesia contributed nothing to the world's production of gold. Now it ranks sixth amongst gold-producing countries. Last year its gold yield was 606,962 fine ounces, valued at £2,526,007. This exceeded the yield for 1907 by 15.4 per cent. The



tonnage of ore crushed was 1,819,230 tons, giving an average of 27.77 shillings per ton. Up to the end of 1908, Rhodesia's total output of gold amounted to 3,208,789 ounces, valued at £11,831,526.

This, in bald figures, is the history of Rhodesia's remarkable progress. Its growth has not been unmarked by difficulties, reverses and discouragements. At present, however, Rhodesian gold mining appears to be established beyond a peradventure.

During the year 1908 the producers contributing to the output numbered 446, as compared with 275 in 1907. Of this total, 28 companies produced more than half the gold reported. One hundred and one tributors and 293 small workers were responsible for the rest. Upon the last class devolved almost all the prospecting done during the year.

### NEW QUEBEC MINING BILL.

A new mining bill was introduced into the Quebec Legislature on Saturday, May 8th. It consisted mainly of amendments to the present Mining Act. The chief amendments are easily outlined. One was designed to extend the time within which an exploitation permit must be taken out. Another increases the penalty for pulling up stakes placed around concessions applied for. This penalty is increased from \$10 to \$25, with an alternative of one month's imprisonment. The third provision restricts the powers of the Governor-in-Council in connection with mining concessions. It withdraws his prerogative to fix and increase the price of mining concessions.

The bill is healthy in tone. It met the approval of both the Government supporters and the Opposition.

## COBALT IN 1908.

Abstract of Report of Arthur A. Cole, Mining Engineer  
for Cobalt District, for Calendar Year 1908.

The approximate production of the world, the United States and Cobalt for the year 1908 is as follows:—

World's production of silver for 1908, 194,000,000 ozs.

United States production of silver for 1908, 51,798,053 ozs.

Cobalt's production of silver for 1908, 18,000,000 ozs.

It will thus be seen that Cobalt supplied over 9 per cent. of the world's production during 1908.

The following tabulation illustrates the advance that Canada has made as a silver producing country, the advance in great part being due to the Cobalt production.

| Country.            | 1906             | 1907             | 1908             |
|---------------------|------------------|------------------|------------------|
| Mexico . . . . .    | 68,500,000 ozs.  | 65,600,000 ozs.  | 69,000,000 ozs.  |
| United States . . . | 56,517,900 ozs.  | 58,850,615 ozs.  | 51,798,053 ozs.  |
| Australasia . . . . | 13,519,410 ozs.  | 17,516,433 ozs.  | ..... ozs.       |
| Germany . . . . .   | 11,649,160 ozs.  | 12,439,896 ozs.  | ..... ozs.       |
| Canada . . . . .    | 8,568,685 ozs.   | 12,750,004 ozs.  | 21,000,000 ozs.  |
| World's prod'n      | 184,552,343 ozs. | 193,542,381 ozs. | 194,000,000 ozs. |

The above figures for 1906 and 1907 were obtained from the Mineral Industry, while those for 1908 are estimated.

Canada thus takes fifth place in 1906, fourth place in 1907, and probably third place in 1908.

The following values are given by the Ontario Bureau of Mines for the shipments from the Cobalt district for 1904, 1905, 1906 and 1907. The value for 1908 is estimated.

|                            |               |
|----------------------------|---------------|
| 1904 . . . . .             | \$ 136,217 00 |
| 1905 . . . . .             | 1,485,570 00  |
| 1906 . . . . .             | 3,573,908 00  |
| 1907 . . . . .             | 6,155,391 00  |
| 1908 (estimated) . . . . . | 9,000,000 00  |

Total . . . . . \$20,351,086 00

The outputs for 1907 and 1908 were distributed for treatment as follows:—

| Country                 | 1907      |        | 1908      |        |
|-------------------------|-----------|--------|-----------|--------|
|                         | Tons      | %      | Tons      | %      |
| Canada . . . . .        | 2,585.05  | 17.40  | 7,401.14  | 29.18  |
| Great Britain . . . . . | 167.13    | 1.13   | 222.08    | .88    |
| Germany . . . . .       | .....     | .....  | 229.46    | 1.18   |
| United States . . . . . | 12,098.95 | 81.47  | 17,439.42 | 68.76  |
| Total . . . . .         | 14,851.34 | 100.00 | 23,362.10 | 100.00 |

Almost all the ore treated in Canada was high grade, so that while the tonnage was less than one-third of the total, the value was greater than that of all the ore shipped out of the country.

### Silver.

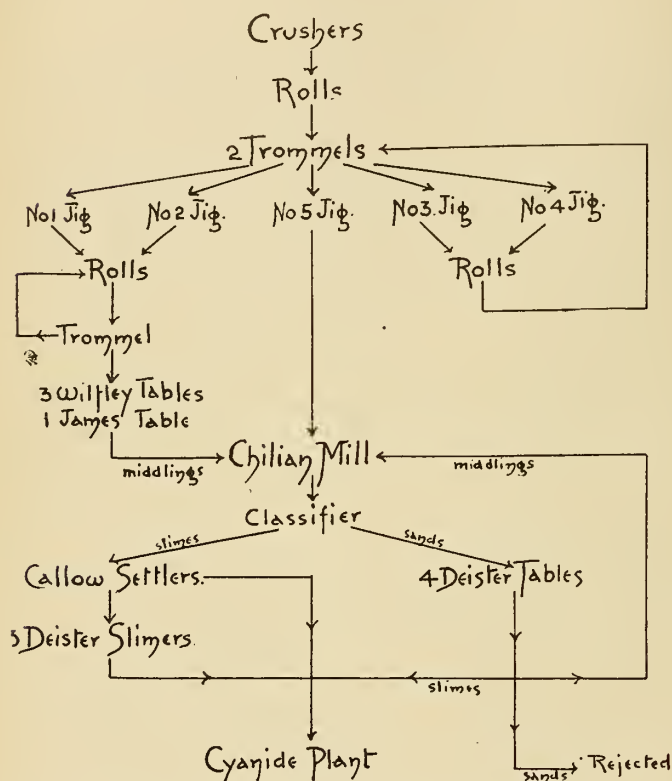
A disappointing feature of the year from the silver mining standpoint has been the continued depression in the price of silver. Towards the close of 1907 the price of silver fell rapidly and 1908 was marked by an almost continued decline. The maximum price was that of 7th of January, 58¾ cents, the minimum being 47½ cents, on the 2nd December. The average price for the year was 52.864, or nearly 12½ cents below the average price for 1907.

The average price by months in cents per fine ounce, at New York, was as follows:—

|                    |        |                     |        |
|--------------------|--------|---------------------|--------|
| January . . . . .  | 55.678 | July . . . . .      | 53.115 |
| February . . . . . | 56.000 | August . . . . .    | 51.683 |
| March . . . . .    | 55.365 | September . . . . . | 51.720 |
| April . . . . .    | 54.565 | October . . . . .   | 51.431 |
| May . . . . .      | 52.795 | November . . . . .  | 49.647 |
| June . . . . .     | 53.663 | December . . . . .  | 48.769 |

The causes for the low price of silver were varied. The almost universal business depression caused a large falling off in the demand for silver in the arts. Another powerful factor was the unrest in the market of

Flow Sheet, Buffalo Concentrator.



the far east, China and India, at times, offering silver while they are usually consistently heavy buyers.

The production of silver in the United States is made in connection with that of lead, copper and other metals. Silver is thus a by-product, and as such its production is not likely to be affected materially by the low price of silver. In Mexico it costs 40 cents per ounce to produce refined silver, so that at the present price the margin of profit is very small. This accounts for the closing down of some of the Mexican mines lately.

In Cobalt the cost of production in the principal mines is under 20 cents per ounce. This is one of the reasons why Cobalt's output has continued to rise even in the face of a falling market.

#### Cobalt.

Cobalt is seldom seen in the metallic state as it is marketed exclusively in the form of oxide. Throughout 1907 the oxide sold for \$2.50 per pound. In March of 1908 a violent rate war caused the price to be cut at frequent intervals until on April 1st it was \$1.45 per pound, a reduction of \$1.05 in a few weeks.

The world's annual consumption of cobalt is about 300 tons. On account of the restricted market and the large production in the Cobalt district, the marketing of Cobalt ores for the cobalt contents has been difficult. The Anglo-French Nickel Co., of Swansea, Wales, came in to the market for a carload of ore from time to time as the demand warranted it.

In the early part of 1908 this company paid the following prices for cobalt:—

- 8 to 10 per cent. cobalt, 35c per pound, Cobalt.
- 10 to 12 per cent. cobalt, 40c per pound, Cobalt.
- 12.1 to 14 per cent. cobalt, 45c per pound, Cobalt.
- 14.1 to 16 per cent. cobalt, 50c per pound, Cobalt.
- 16 per cent. or over, cobalt, 55c per pound, Cobalt.

After April the prices offered were 10 cents per pound lower than above, and at the end of the year they were out of the market entirely. There is ever likelihood that the next price offered will be still lower.

The Canadian Copper Co. and the Deloro Mining and Reduction Company each pays for cobalt in ore when it goes 6 per cent. or over, providing that the nickel contents are lower than the cobalt contents.

#### Arsenic.

For a time one smelting company did pay a small amount for arsenic, but this has been cut out of the latest schedule, so that no arsenic is now paid for, though several smelting companies save, refine and market as a by-product in the form of white arsenic.

#### Nickel.

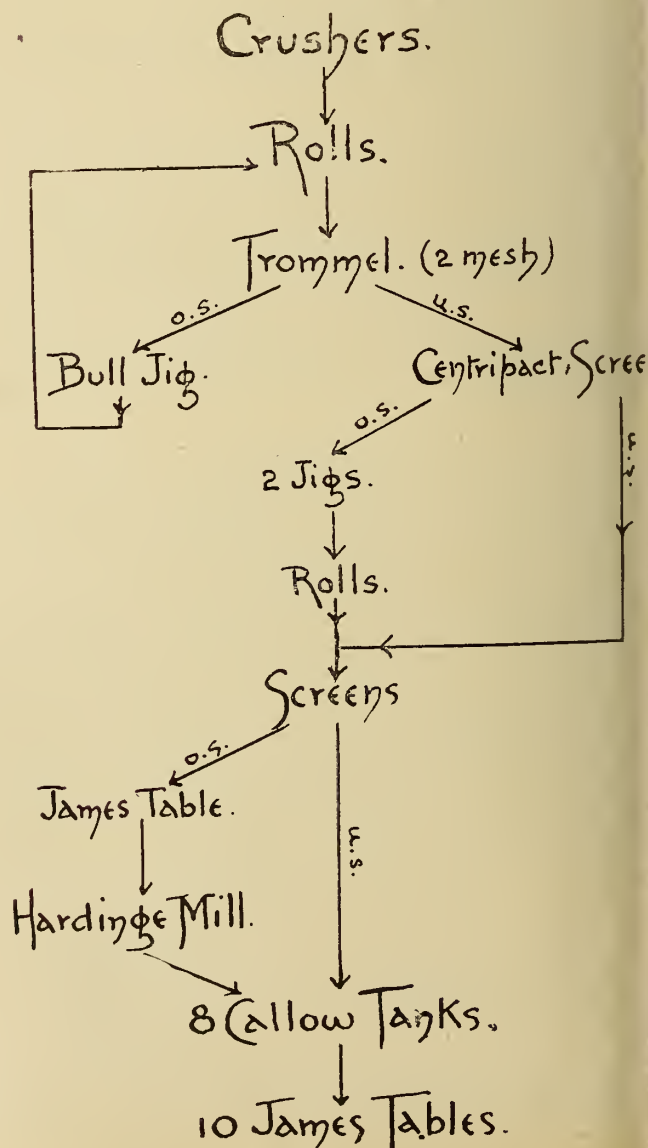
Up to the present nickel contents of ores from Cobalt have been considered more of a detriment than otherwise.

#### Smelting.

The following smelting companies have received and treated ore from Cobalt during 1908.

1. Anglo-French Nickel Company, Swansea, Wales.
2. American Smelting & Refining Co., Perth Amboy, N.J., Denver, Col.

Flow Sheet, Cobalt Central Concentrator.





3. Balbach Smelting & Refining Co., Newark, N.J.
4. Beer, Sondheimer Co., Hamburg, Germany.
5. Canadian Copper Co., Copper Cliff, Ont.
6. Coniagas Reduction Company of Canada, Orford, Ont.
7. Consolidated Mining & Smelting Co., Trail, B.C.
8. Deloro Mining & Reduction Co., Deloro, Ont.
9. Pennsylvania Smelting Company, Carnegie, Pa.
10. The United States Metal & Refining Co., Chrome, N.J.

#### 1. Anglo-French Nickel Company, Swansea, Wales.

The prices paid by this company for cobalt ores are given under the heading "Cobalt." Payment was made for the cobalt contents and no allowance was made for the silver values in the ore purchased.

#### 2. American Smelting & Refining Co., New York.

This company received ores from Cobalt at its plants at Perth Amboy, N.J., and Denver, Col. The schedule offered was as follows:—

Payment.—Forty-five days after date of sampling. If a mine is willing to contract for a total year's output or 1,000 tons, the following schedule is offered:

#### For Ores Under 1,500 Ounces and Over 60 Ounces.

Silver.—Pay for 95% of the silver contents at the New York quotations.

Treatment Charge.—\$7.00 per ton of 2,000 pounds, dry weight; in case of cash settlement the treatment charge is \$7.50 per ton.

No payment for cobalt or nickel.

No penalties for insoluble.

Arsenic.—An addition to the working charge will be made at the rate of 25 cents per dry ton for each per cent. of arsenic in excess of 5 per cent.

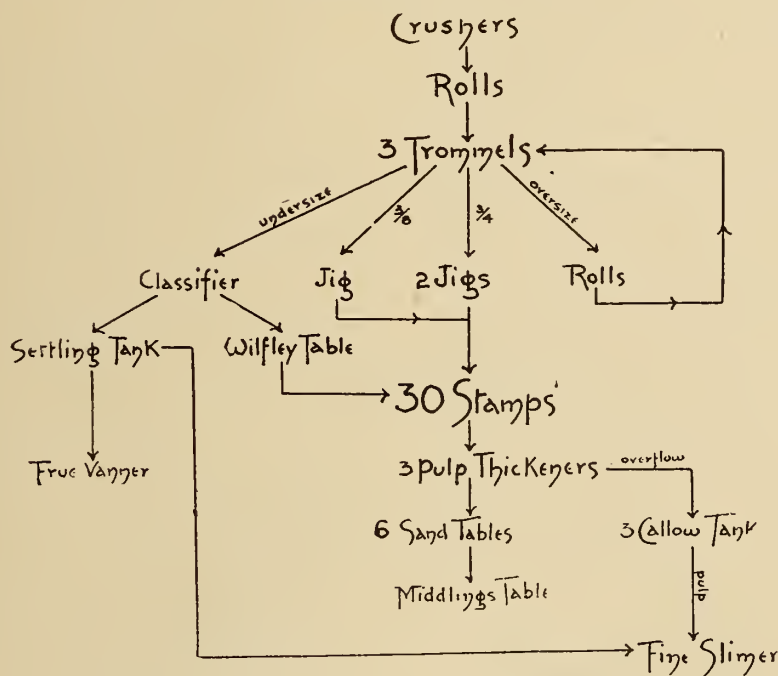
Payment.—Payment forty-five days after agreement of assays.

The freight from Cobalt to Perth Amboy, N.J.

#### 3. Balbach Smelting & Refining Co., Newark, N.J.

This company only entered the market occasionally,

Flow Sheet, Coniagas Concentrator.



#### For Ores Assaying 1,500 Ounces or Over per Ton.

Silver.—Pay for 94% of the silver contents at the New York quotations.

Treatment Charge.—\$10.00 per ton of 2,000 pounds, dry weight, plus one-half cent on each ounce of silver contained.

Arsenic.—An addition to the working charge will be made at the rate of 25 cents per dry ton for each per cent. of arsenic in excess of 5 per cent. Sampling free.

Payment.—Thirty days after agreement of assays.

#### For Ores Under 1,500 Ounces and Over 60 Ounces per Ton.

Silver.—Payment for 93% of the silver contents at the New York quotations.

Treatment Charge.—\$9.00 per ton of 2,000 pounds, dry weight, plus one-half cent on each ounce of silver contained.

Arsenic.—An addition to the working charge will be made at the rate of 25 cents per dry ton, for each per cent. of arsenic in excess of 5 per cent.

and had no standing schedule. The ore purchased was high grade.

#### 4. Beer, Sondheimer Co., of Hamburg, Germany.

This German company purchased high-grade ore in the Cobalt camp on the following schedule:—

Silver.—Pay for 94% of silver assay.

Treatment Charge.—\$44.00 smelting charge per dry ton.

Freight.—\$10.00 freight guarantee per gross ton. Beer, Sondheimer to supply barrels free of charge, suitable for transporting the ores.

Payment.—70% paid immediately against Ledoux & Co.'s assays. 30% paid three days after settlement of assays of Dr. Fred Claudet, of the Bank of England. Interest at 6 per cent. (6%) till due date. Dr. Claudet's expenses to be paid by Beer, Sondheimer & Co.

#### Canadian Copper Co., Copper Cliff, Ontario.

All purchases of Cobalt ores are made through the Orford Copper Co., of New York. The purchasing schedule was as follows:—

## Purchaser to make payment for:—

|          | % silver per ton ore when same assays | 100 oz. ag. and over. |
|----------|---------------------------------------|-----------------------|
| 75 %     | " " "                                 | 200 " "               |
| 84 %     | " " "                                 | 300 " "               |
| 86 %     | " " "                                 | 400 " "               |
| 87 %     | " " "                                 | 500 " "               |
| 89 %     | " " "                                 | 600 " "               |
| 90 %     | " " "                                 | 800 " "               |
| 92 %     | " " "                                 | 1,000 " "             |
| 93 %     | " " "                                 | 1,300 " "             |
| 93 1/4 % | " " "                                 | 1,600 " "             |
| 93 1/2 % | " " "                                 | 2,000 " "             |
| 94 1/2 % | " " "                                 | 3,000 " "             |

|                                        |                      |
|----------------------------------------|----------------------|
| \$10 per ton of ore when same contains | 6% cobalt and over.  |
| \$20 per ton of ore when same contains | 8% cobalt and over.  |
| \$30 per ton of ore when same contains | 12% cobalt and over. |

No payment will be made for cobalt in ores containing less than 6% cobalt, nor in which the nickel contents are greater than the cobalt contents. Further, purchaser reserves the right to return, at shipper's expense, any such ores (i.e., nickel contents higher than cobalt contents) received at Copper Cliff.

as is due the seller in settlement upon these dates, such delivery to be made in New York City.

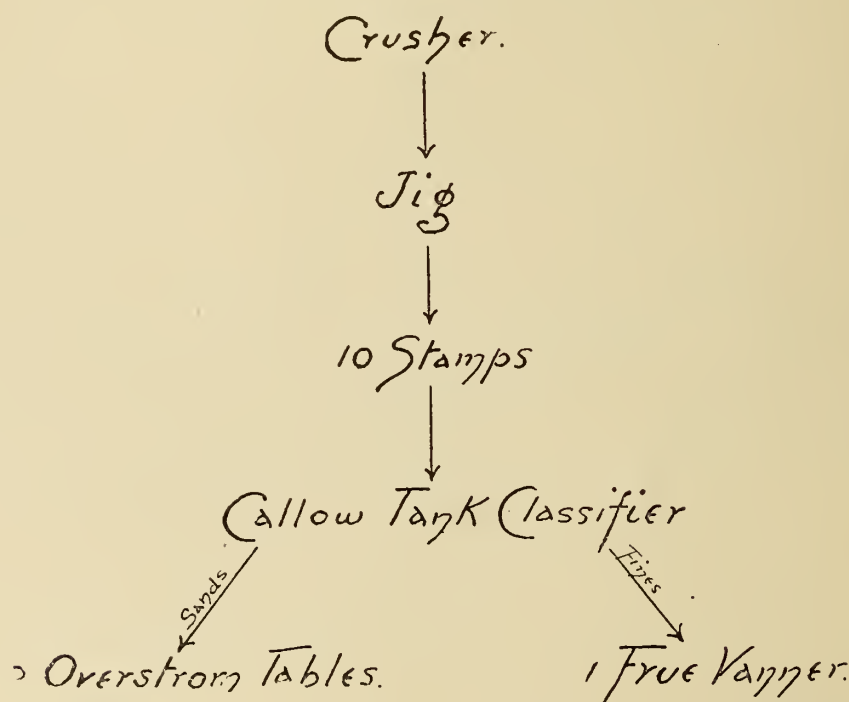
Payment for cobalt will be made as per the above scale when the cobalt content of the ore comes within the specifications mentioned, settlement for same to be made on the first due date for silver, namely, in 35 days after completion of sampling of ore.

Purchaser has named a rate of 75% silver return to the shipper on ore running from 100 to 200 ounces per ton of 2,000 pounds. This is to be considered as a penalty clause, and to apply in such cases where ores under 200 ounces have been shipped by mistake. Purchaser does not agree to accept regular shipments of ore which run less than 200 ounces of silver per ton of 2,000 pounds.

All purchases of these ores are made strictly subject to the following force majeure agreement:—

"If, by reason of the acts of God, strikes or other causes beyond control of either parties hereto, which may legally be called force majeure, either of them shall

Flow Sheet, King Edward Concentrator.



Ore to be delivered by seller to the Canadian Copper Co., f.o.b. cars, Copper Cliff, Ont. Ore to be at shipper's risk until sampling is undertaken, as purchaser can assume no responsibility for the ore until same has been taken into its sampler.

Purchaser to sample at its expense, purchaser's and seller's representatives to be present. Assays to be made by Ledoux & Co., of New York, at seller's expense, which assays are to govern in settlement.

Payment of 70% of the silver returnable to the seller, as per the above scale, to be made at the New York official price for silver on the first settlement date, which shall be 35 days after the date on which sampling of the ore is completed, and the balance, 30 per cent., on the second settlement date, on the New York official price of silver on that day, which shall be 90 days after sampling of the ore is completed. The purchaser, however, reserves the right to deliver upon either or both of the settlement dates above specified, in lieu of cash, at its option, such silver bullion (commercial bar silver)

be unable to carry out the conditions of this agreement as to shipment, receipt or treatment of consignments this agreement shall be suspended as long as this condition shall continue and the term of this agreement shall then be extended for such a period as shall be equivalent to the time of delay or interruption."

Further, this clause shall also cover unavoidable or extraordinary delays should they occur when the speis or silver bullion resultant from the smelting and treatment of these ores is in transit between Copper Cliff and Camden plants of the purchaser and between either of the above plants and the silver refinery of the Babcock Smelting Co., Newark, N.J.

#### 6. Coniagas Reduction Co., Limited, of Thorold, Ont.

Up to the present time the only ore treated by this smelter came from the Coniagas mine. It is likely, however, that custom smelting will be started during 1909.



The following is an extract from the 1908 report of the Coniagas Mines, Limited:—

"The works at Thorold are now handling the product of your mine (the Coniagas), and are running commercially as regards the production of refined silver and refined white arsenic, and we expect to place refined cobalt, oxide, and nickel oxide on the market very shortly, thus refining and marketing all the valuable constituents of your ores by a process which is confidently expected to yield a substantial profit."

**The Consolidated Mining & Smelting Co., of Canada, Trail, B.C.**

This smelting company has so far only purchased several test carload lots.

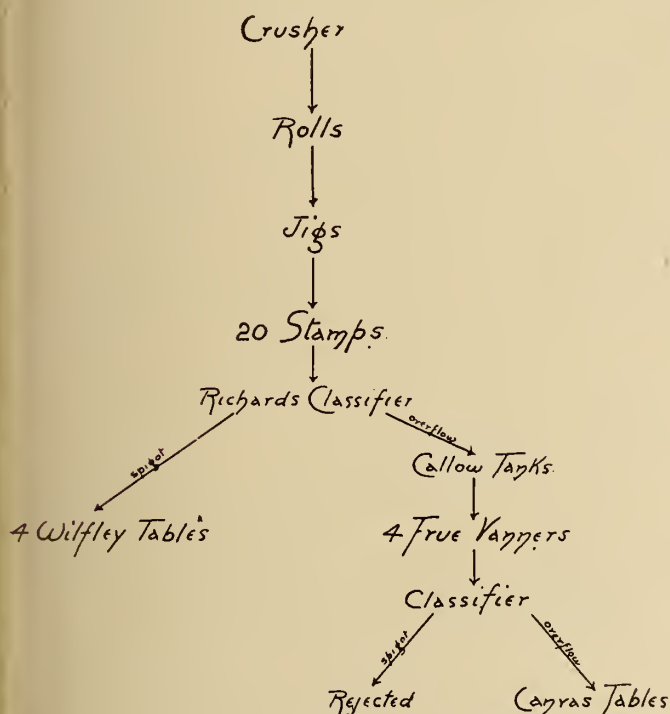
**8. Deloro Mining & Reduction Co., Deloro, Ont.**

Tariff on Cobalt Silver Ores and Concentrates.

Silver.—Pay for 98% of silver contents.

Treatment Charge.—\$20.00 per ton of ore and a refining charge of one cent per ounce of silver contained.

Flow Sheet, Northern Customs Concentrator.



Terms of Payment.—75% of net proceeds at New York quotation 30 days after completion of sampling. 25% of net proceeds at New York quotation 90 days after completion of sampling.

Cobalt.—On ore containing 6% and over, 10 cents per pound for cobalt contained. No payment will be made for cobalt in ores containing more nickel than cobalt. Payment for cobalt to be made with the second payment of silver. Ledoux & Co.'s assays accepted with the usual provisions as to umpire assays in case of unusual differences. Above assays to be made at shipper's expense. No charge for sampling. Ore to be delivered in carload lots f.o.b., Marmora Station, C. O. R. This tariff is subject to change without notice.

**9. Pennsylvania Smelting Co., Pittsburg, Pa., Works at Carnegie, Pa.**

Ores from Cobalt ranging from 50 ounces to 500 ounces per ton are purchased by the Pennsylvania Smelting Co. on the following schedules:—

Silver.—Pay for 95% silver, less one cent per ounce.

Treatment Charge.—\$9.00 per ton. Settling price, average for 20 days following date of arrival. No payment for cobalt or nickel. The freight rate from Cobalt to Carnegie, Pa., is \$8.80 per ton.

**10. United States Metal and Refining Co., Chrome, N.J.**

This company only bought an occasional carload of high-grade ore on special quotations.

**Concentration.**

Concentration now takes a very important position in the district's development. Undoubtedly in some instances the shipments to the smelters are smaller than formerly, due to the reduction of tonnage by concentration, nevertheless in most cases the tonnage is increased by the amount of the concentrates, as the ore treated is of such a low grade that it could not stand the freight and treatment charges without concentration.

Six mills are now in successful operation in the camp, and four more are under construction.

They belong to the following companies:—

1. The Buffalo Mines Company, Limited.
2. The Standard Cobalt Mines, Limited (Cobalt Central).
3. The Coniagas Mines, Limited.
4. King Edward Cobalt Silver Mines.
5. The Northern Customs Concentrators, Limited (formerly Muggley).
6. Nipissing Reduction Company.
- Under construction:—
7. Colonial Mining Company.
8. McKinley-Darragh-Savage Mines of Cobalt, Ltd.
9. Nova Scotia Mining Company.
10. O'Brien Mine.

The following table gives the tonnage of ore milled, the concentrates made, and the concentration ratio for the mills during 1908:—

**Concentration in Cobalt for 1908.**

| Mill.                                | Mines               | Ore milled Tons | Concentrates Tons | Concentration Ratio |
|--------------------------------------|---------------------|-----------------|-------------------|---------------------|
| 1. Buffalo.....                      | Buffalo .....       | 10,200          | 251.00            | 40—1                |
| 2. Cobalt Central....                | Bailey .....        | 4,246           | 97.15             | 44—1                |
|                                      | Big Pete .....      | 9,163           | 143.90            | 64—1                |
|                                      | Crown Reserve ....  | 669             | 15.22             | 44—1                |
| 3. Coniagas .....                    | Coniagas .....      | 13,605          | 304.00            | 45—1                |
| 4. King Edward....                   | King Edward .....   | 1,043           | 21.35             | 38—1                |
| 5. McKinley-Darragh (Old Mill).....  | McKinley - Darragh  | 450             | 20.00             | 28—1                |
| 6. Northern Customs Concentrator.... | City of Cobalt .... | 2,194           | 50.61             | 43—1                |
|                                      | Cobalt Townsite ... | 1,000           | 31.03             | 32—1                |
|                                      | Right of Way .....  | 1,500           | 36.46             | 41—1                |
|                                      | Silver Queen .....  | 3,253           | 70.63             | 46—1                |
| 7. Nipissing Red. Co.                | Foster .....        | 85              | 10.00             | 9—1                 |
|                                      | King Edward .....   | 40              | 1.50              | 27—1                |
|                                      | Kipissing .....     | 1,950           | 40.00             | 49—1                |
|                                      | Silver Lead .....   | 35              | 1.00              | 35—1                |
| Totals .....                         |                     | 49,424          | 1,093.85          | 45—1                |

At the mines without mills the grade of ore is raised by cobbing, washing and handpicking. The ore is usually first passed over a grizzly or coarse screen, as the screenings generally carry enough values to be of shipping grade without further treatment. At the Crown Reserve and Trethewey mines jigs are used in addition to the hand-picking.

With the smelter schedules and freight rates at present in force an ore must run about 45 ounces per ton to pay charges outside of the cost of mining. All ores below this point must therefore be concentrated if they

are to be shipped. The point at which the combined concentration and smelting rates meet the direct smelting rates is about 90 ounces. If, however, a mine owns its own mill the grade of ore that can be concentrated more profitably before shipping to the smelter direct is much higher. In the future, if present conditions hold, it will be natural to expect that very little ore will be shipped from the camp that will assay less than 100 ounces per ton.

In the following mill flow sheets all the smaller details have been cut out, leaving only the main working features.

The flow sheet of the Colonial Mill is to be similar to that of the King Edward.

The Northern Customs Concentrators, Limited, (formerly the Muggley Concentrator) and the Nipissing Reduction Company are custom mills, while the Cobalt Central Mill accepts some custom work, as well as the treatment of ores from the Cobalt Central mines.

The Northern Customs Concentrators, Limited, is now treating ores on the following contract schedule:—

by the Temiskaming and Northern Ontario Railway Commission:—

1. City of Cobalt Mining Company.
2. Cobalt Townsite Mining Company.
3. Nancy Helen Mines, Limited.
4. Railway Reserve Mines, Limited.
5. Right of Way Mining Company.
6. Wright Mining Company.
7. Jack Pot Silver Mining Company.
8. Cobalt Station Grounds Mining Company.
9. Ontario Development and Mining Co., Limited.

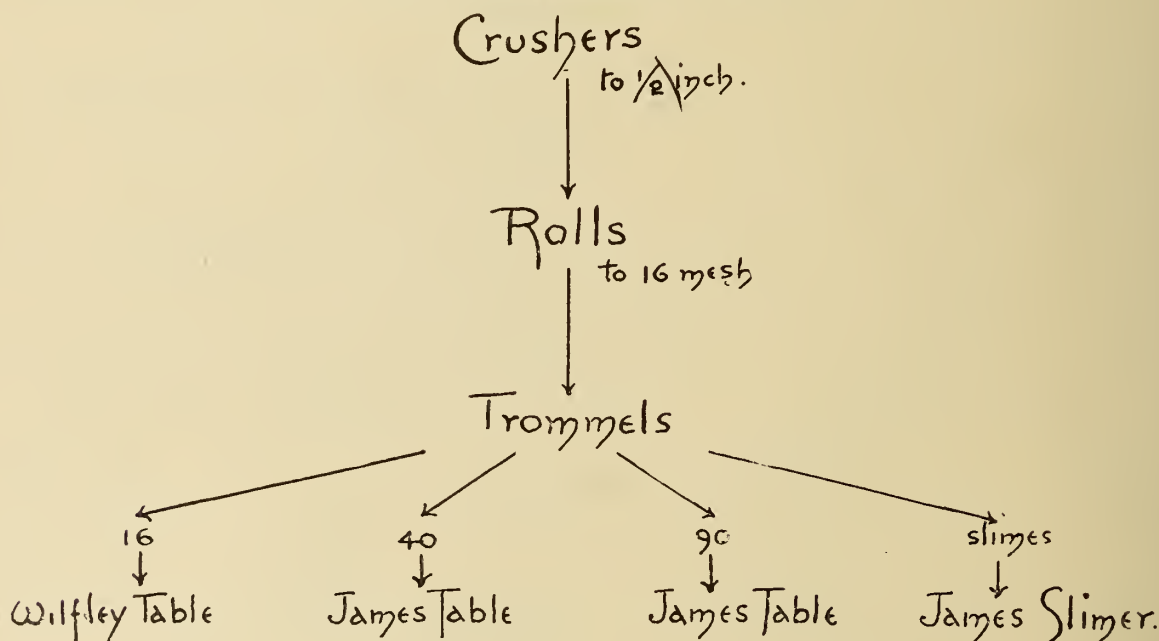
#### 1. City of Cobalt Mining Company.

The following was the underground development work done by this company during 1908:

|                              |             |
|------------------------------|-------------|
| Sinking .....                | 136 feet    |
| Drifting and crosscutting... | 1,935 feet. |
| Stoping .....                | 77,850 feet |

During the summer a new compressor plant was installed.

Flow Sheet, Nipissing Reduction Co. Concentrator.



On ore yielding less than 20 ounces silver per ton crushed, retain 10 ounces and return balance with 50 per cent. of other metals that can be sold.

|                             |              |
|-----------------------------|--------------|
| 20 to 40 ounces silver pay  | 55 per cent. |
| 40 to 60 ounces silver pay  | 60 per cent. |
| 60 to 80 ounces silver pay  | 65 per cent. |
| 80 to 100 ounces silver pay | 70 per cent. |

The Nipissing Reduction Company will treat ores on a flat rate of \$3.00 per ton or on the following percentage basis.

For ores assaying when received at the mill,

|                              |                             |
|------------------------------|-----------------------------|
| 20 to 40 ounces silver pay   | 50 per cent. silver values. |
| 40 to 60 ounces silver pay   | 55 per cent. silver values. |
| 60 to 80 ounces silver pay   | 60 per cent. silver values. |
| 80 to 100 ounces silver pay  | 65 per cent. silver values. |
| 100 to 150 ounces silver pay | 68 per cent. silver values. |

#### Leases.

During 1908 the following mining companies operated on a royalty basis on mineral lands owned and leased

#### 2. Cobalt Townsite Mining Company.

The development for 1908 consisted of:—

|                    |                  |
|--------------------|------------------|
| Sinking .....      | 158 feet         |
| Crosscutting ..... | 249 feet         |
| Drifting .....     | 712 feet         |
| Raising .....      | 104 feet         |
| Stoping .....      | 5,021 cubic feet |

#### 3. Nancy Helen Mines, Limited.

The total underground development work on this property at the end of the year 1908 consisted of:—

|                    |           |
|--------------------|-----------|
| Drifting .....     | 357 feet. |
| Crosscutting ..... | 274 feet. |
| Shaft .....        | 155 feet  |

and considerable stoping.

#### 4. Railway Reserve Mines, Limited.

The development work on this property consisted of some trenching and shallow shaft sinking.

#### Right of Way Mining Company, Limited.

At the end of 1908 the total underground develop



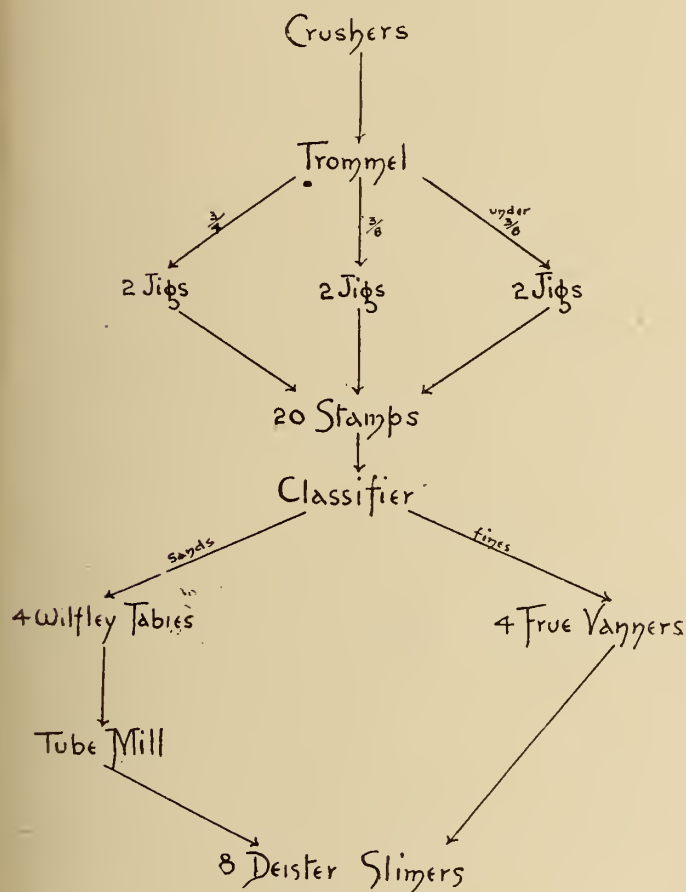
ment work of this company exclusive of stopes of the following:—

| —                          | Drifting | CrossCutting | Sinking |
|----------------------------|----------|--------------|---------|
| No. 1 .....                |          |              | 75      |
| No. 2 .....                | 1,094    | 1,890        | 563     |
| No. 3 .....                | 103      | 309.5        | 95      |
| Total to end of 1908 ..... | 1,197    | 2,199.5      | 733     |
| Total to end of 1907 ..... | 274      | 151          | 216     |
| Total for 1908 .....       | 923      | 2,048.5      | 517     |

#### 6. Wright Mining Company.

The work done on this property during 1908 consisted of the most part of surface trenching. In all

Flow Sheet, McKinley-Darragh Concentrator.  
(Under Construction.)



4,328 feet of trenches were dug, in many places being a depth of 10 to 12 feet. The only underground work was 56 feet of drifting.

#### 7. Jack Pot Silver Mining Company, Limited.

This property has been idle all year.

#### 8. Cobalt Station Grounds Mining Company.

The lease for this property was signed late in the year and the company only had time to do some surface prospecting.

#### 9. Ontario Development and Mining Co., Ltd.

This lot has been prospected by surface trenching and is now being tested by diamond drilling.

#### Progress During the Year 1908.

A rapid, but healthful advance marks the progress of the Cobalt District. The shipments in 1908 were greater than the combined shipments of the four previous years. A point that appeals particularly to the investing public is the fact that more than 50 per cent. of the value of the total output of the camp has been paid back to shareholders in dividends.

In the early work of the mines, while rich ore could be dug out on the surface, mining costs did not receive very serious attention. As development proceeds, however, production costs are being lowered, by such economies as the installation of large and more efficient machinery. Possibly the feature of the year in underground work has been the large introduction of air hammer drills for stope work.

Two power plants are being installed on the Montreal River and it is expected that before the end of 1909 power will be delivered in Cobalt by them, in one case in the form of compressed air, and in the other, electricity. The introduction of this power is likely to cut down the present cost by at least 50 per cent.

There are now about 3,500 men employed in the mines at Cobalt and in the immediate vicinity.

The horse power capacity of the camp is as follows:

| At the End of | Boiler H. P. |
|---------------|--------------|
| 1904 .....    | Zero         |
| 1905 .....    | 150          |
| 1906 .....    | 3,406        |
| 1907 .....    | 7,918        |
| 1908 .....    | 9,700        |

There are now 61 compressors which have a maximum capacity of 39,336 cubic feet of free air per minute.

Colored wrappers for dynamite cartridges have been suggested. This would facilitate the detection of unexploded cartridges lying in broken rock underground. Necessarily the wrappers should be of a color that is in sharp contrast to the ore and rock that is being worked. Another suggestion is that the wrappers should carry some striking design that would render detection easier.

Under the revised company law of the Transvaal the Attorney-General is provided with power to appoint inspectors to investigate the affairs of any company and to report on their conduct when he has been requisitioned to do so by members of a company having a share capital, such members holding not less than one-tenth of the issued shares between them, and also on the application of one-fifth of the number of persons on the register of a company not having a share capital.

Auriferous smaltite, impregnating quartzite, is being worked on a small scale north of Middleburg, on Kruis River, Transvaal.

According to the opinion of Mr. Lionel Phillips, retiring president of the Transvaal Chamber of Mines, it is the belief of many metallurgists that amalgamation plates can be dispensed with, and the whole of the free gold recovered by direct cyanide treatment. If experiments in this direction prove successful the opportunities for gold stealing by employees would be much reduced and smaller plants would serve the purpose.

# PETROLEUMS AND COALS.

## Compared in Their Nature, Mode of Occurrence and Origin.

By Eugene Coste, E.M., Toronto.

(Printed as an advance paper of the Canadian Mining Institute.)

(Continued from last issue.)

The total thickness of the formations more or less impregnated with the oil is about 25,600 feet. Although we have here three geological unconformities, meaning long lapses of time and erosion between the deposition of the different formations, yet the oil is in all of them through a thickness of over 25,000 feet of strata from and including crystalline rocks to the most recent gravels, but only along great faulted lines and zones of disturbances. There are three conclusions to be drawn from this, which are plain: 1st. The movements of the oil were vertical, not lateral. 2nd. Some of these movements at least were of recent date, namely, Post-Quaternary. 3rd. It cannot reasonably be supposed, as some geologists have, that this oil originated in any one of these formations (such as the Monterey, which is often cited by Arnold as the source of the oil) as this would entirely fail to explain the oil in the formations below the Monterey, and also the oil in unconformable formations above the Monterey. Oil formed from decomposition of organic remains in the Monterey, as supposed by Arnold, would either have remained in that formation, if the Monterey shales were impervious enough to prevent its escape into the atmosphere, or, if they were not, would have exhausted out into the atmosphere long before the Fernando and Quaternary strata were deposited unconformably over it. There is only one possible explanation, namely, solfataric volcanic emanations of hydrocarbons coming up from below the crystalline gneisses along the fault lines and in the zones of disturbances at repeated periods of dynamic movements of the Coast Range, and some of these movements must have been very recent to explain the oil in the gravels of the Quaternary. Even in the Monterey shales, as in all the so-called "bituminous shales" it is plain that the petroleum is a secondary product of impregnation subsequent to the forming of the shales, as evidenced by the facts that these shales are bituminous only along the zones of disturbances, and in local and irregular pools; in these it is not in any way spread over uniformly in one or more beds, but it is distributed in the shape of branching streaks, veins, patches, and in the joints and cracks; in fact, the portions impregnated with bitumen often look like a regular breccia, indicating plainly the injected nature of the bitumen.<sup>1</sup>

In one of my other papers<sup>2</sup> on this subject before this Institute I have emphasized by other examples this well-established geological fact with regard to the occurrences of petroleum, illustrated grandly by the California example just cited above, namely, that the petroleum deposits belong to no special horizon of the geological scale, but that they are found in any and all of them, including the crystalline rocks, and, as we have seen, also in volcanic emanations, in volcanic and igneous rocks, in metalliferous veins and in meteorites. When to this consideration we add the further one that

these petroleum deposits are found in great abundance in certain districts in the porous reservoir-rocks of thousands of feet of the geological scale, but only when these are aligned in narrow long belts along certain structural lines, while neighboring districts outside of these lines, but with the same geological sequence of formations are absolutely barren, we see that we must necessarily consider petroleum as secondary products of impregnation and replacement coming up along these structural channels from a source below the last formation in which it is found, namely, the crystalline rocks. It must also necessarily be inferred that the latest incoming or emanations of these secondary petroleum products through all these strata are younger than the youngest impregnated formation.

The solid petroleum is also found in zones of great fracturing and of profound disturbance in parallel vertical veins following the general direction of the orogenic uplifts of their particular district and cutting all the strata and in every way similar to mineral veins. This is well proven in California, Utah, Indian Territory, Galicia and other places, instances of which will be found in one of my other papers<sup>1</sup> on this subject. Arnold<sup>3</sup> and Ellis<sup>3</sup> have both shown instances from California and from the Barbadoes Islands, respectively, in which the solid petroleum was replaced in depth in the same vein by liquid petroleum.

In some of the more recently formed oil and gas deposits, as in Texas and Louisiana, where the oil and associated salt waters are often hot yet, the petroleum occurs in vertical chimneys of salt, gypsum, sulphur, calcite, dolomite, and silica, replacing and uplifting Quaternary. Tertiary and Cretaceous clays and sands, and forming peculiar qua-qua-versal domes called salines, mounds or salt islands. The local uplifts in some of the salines of Louisiana and Texas are extraordinary, as much as one to two thousand feet in an elliptical area, but a mile or so across, and these salines, as Capt. Lucas pointed out long ago, are ranged along straight lines. Mr. G. D. Harris, in an article just published,<sup>1</sup> gives us an interesting map of the structural lines of dislocation of this region, and shows that they belong to two systems more or less at right angles one to the other, and parallel to the great Balcones fault for the northeast system, and to the Red River and Alabama Landing fault for the northwest system. He also shows that the salines are all located along these lines of weakness, and he claims at the intersection of two of these lines where a still weaker point was determined "admitting the upward passage of fluids or gas under pressure from below:" but Mr. Harris is still under a similar impression, as Mr. Robt. T. Hill was,<sup>2</sup>

<sup>1</sup>Journ. Can. Min. Inst., Vol. VI, pp. 104-108.

<sup>2</sup>Bulletin No. 309 and 317, U.S. Geol. Survey.

<sup>3</sup>The Geology and Mineral Resources of Trinidad and Barbadoes Islands.

<sup>1</sup>Economic Geology, Vol. IV, No. 1, Jan.-Feb., 1909, p. 12.

<sup>2</sup>Trans. Am. Inst. Min. Eng., XXXIII, 363.

<sup>1</sup>Bulletin U.S. Geol. Surv., No. 317, pp. 29-41.

<sup>2</sup>Journ. Can. Min. Inst., Vol. VI, pp. 109-113.



namely, that these gaseous and liquid substances are carried to these salines by artesian waters entering the pervious layers of the Mesozoic, or Paleozoic, far up country and going down to greater and greater depths as the latitude of the Gulf border is approached to ascend under hydrostatic pressure at the above mentioned points of weakness. As I have pointed out twice before,<sup>3</sup> several years ago, the pressure to which the fluids under the salines are subjected is not hydrostatic and it is also impossible for meteoric waters to gather and carry down from sediments the diversified products of these salines, especially insoluble liquid hydrocarbons and such gases as natural gas and hydrogen sulphide. Permit me to recall here the explanation of the nature of these salines, which I gave before this Institute six years ago<sup>1</sup>: "But, on this continent, in the newly-discovered oil fields of Texas and Louisiana, we have many no less direct evidences of vulcanism, though they do not appear to have been understood in their true light. These are the salt islands and the mounds of the Coast Prairie, such as the famous 'Spindletop,' near Beaumont, which are clearly nothing else but 'suffionis,' or 'salses,' hardly extinct yet, grouped along fractured lines and marking in that region the dying out of vulcanicity, that is to say, the dying, distant echo of that tremendous volcanic energy which, a little further south, in Mexico, Central America, and in the islands and along the south coast of the Caribbean Sea, is to this day so powerfully active. When these occurrences of petroleum in the Texas-Louisiana salines are considered in the light of what is now being found a little further south along the Gulf-Coast plain in the new oil fields of Mexico, where, as noticed above, the oil is found around many volcanic necks, it can be seen that the view which I took six years ago that these salines were regular solfataric volcanic vents, was the right one. In the Mexican oil fields the volcanic action has been a little more intense, and instead of only the hot gases, vapors and waters piercing up more or less through the horizontal strata to form the salines, as in Texas and Louisiana, we see the volcanic lava cones themselves piercing up boldly through the plains. There is, no doubt, that these lava cores in Mexico, surrounded with petroleum and other solfataric emanations, are one and the same volcanic phenomenon as the vertical chimney of salt, hot water and hot petroleum of the Texas-Louisiana salines.

**Origin.**—The opposite chemical nature of the members of the two series of natural carbon compounds, namely, oxidized complex carbon compounds for the coals and a mixture of reducing hydrocarbons for the petroleum, gives us the first hint of the surface or external origin of the coals, and of the internal origin of the petroleum. Beneath the earth's surface, as is well known, there is a deficit of oxygen, and hence we find none in the natural hydrocarbons from the interior, except in the solid varieties, which are the oxygenated and sulphureted residue of the other petroleum in places where they came near enough the surface. The coals on the contrary obtained their oxygen from the atmosphere at first in their original state of vegetation, and have retained part of it during the carbonizing process to which they have been subjected.

**Coal Series.**—The origin of the members of the coal series from the natural decomposition of vegetable matter, either in place or drifted, is abundantly proven,

and is now generally acknowledged and admitted among geologists.

**Petroleum Series.**—It is, however, very different in the case of the petroleum, the origin of which is still admitted by many, as a matter of fact requiring no demonstration, to be due to some unseen and unexplained decomposition of organic matter. Other geologists have discussed the subject at length, and have tried to prove the organic origin of the petroleum, but not one has ever been able to point out to a single case where a petroleum production process coeval with the kingdoms of life could be witnessed in Nature to-day. Some other geologists are discouraged and proclaim the origin of petroleum as a profound mystery not yet solved by science.

As I have long contended, I, for one, cannot understand how it is that the solfataric volcanic origin of the petroleum should be considered as any more doubtful and less proven than is the organic origin of the coals. It seems to me that the geological facts proving the one are just as clearly established scientifically to-day as are the facts proving the other. They are simple facts, the A B C, so to say, of geology, and yet strange to say, they are every day ignored and set aside.

There can be only two kinds of organic matter in nature to which the derivation of petroleum might be attributed, namely:—

First—The soft tissues of animals.

Second—Vegetation.

1st.—But the soft tissues of animals always decompose, decay completely and disappear entirely before their entombment in the sedimentary strata can possibly take place. It leaves us, therefore, only the vegetation to deal with in the consideration of this problem. That the soft tissues of dead animals entirely disappear before the entombment of their hard part, even in the comparatively rare cases where the entombment of the latter takes place, is one of the best known and best proven facts in geology—water, carbon dioxide and ammoniacal salts, are the chief products of the decomposition,<sup>1</sup> no petroleum is formed. If it had been otherwise we would not find, as we do, even in late Quaternary deposits, many beds composed entirely of ostras, corals, marls and shells of all kinds, such, for instance, as the "coquina" beds of Florida, absolutely devoid of some carbon compound to represent the supposed entombed soft tissues of the animals, while in the fossils, shells and other hard parts of the animal life, which we have collected in great abundance in our paleontological museums, from strata of every geological age, we would surely often see at least a modicum of some carbon-compound. But we may examine millions of these fossils and see nothing of the kind, even when these fossils have been collected in impervious shales from which the decomposed products of the soft tissues of the animals, if they had been entombed and had decomposed there, could not possibly have escaped. In very rare cases we do find portions of strata with shells or other fossils filled up with liquid petroleum, but in these cases we also find the seams, joints and other open or porous parts of these strata impregnated with the same fluid, showing plainly that it is a secondary product of infiltration and replacement. Many other substances have thus filtered through the strata and petrified or mineralized the

<sup>3</sup>Jour. Can. Min. Inst., Vol. VI, p. 93, and Trans. Am. Inst. Min. Eng., Vol. XXXV, pp. 292, 293.

<sup>1</sup>Jour. Can. Min. Inst., Vol. VI, p. 89.

<sup>1</sup>Bulletin U.S. Geol. Surv., No. 330, p. 116.

<sup>2</sup>Bulletin, U.S. Geol. Surv., No. 330, p. 635.



fossils, such as calcite, silica, pyrites and a great many others, including such metals as copper and mercury. In all such cases there can be no implication of a community of origin between the infiltrated products and the organism. Yet many geologists often quote some of these rare occurrences of petroleum in hard parts of organisms, and use them as evidence bearing in favor of the derivation of it from these organisms, whether fish, molluse, or other organisms. For instance, in a recent memoir on the natural hydrocarbons by Frank Wigglesworth Clarke,<sup>1</sup> I find the following: "Dicaulfaït observed that the copper shales of Mansfield are strongly impregnated with bitumen, and also rich in fossil fish. The petroleum of Galicia is always associated with menilitic schists, in which fish remains are peculiarly abundant. . . . G. A. Bertels, on the other hand, attributes the Caucasian petroleum to the decomposition of molluscs. In the Kuban district, the oil, accompanied by salt water, exudes directly from beds of molluscan remains, which occur in enormous quantities." I wish to point out in answer: that in the great majority of cases even traces of fossils of any kind are impossible to find in the prolific oil and gas sands of the United States, and of the other parts of the world at large, and, therefore, that one is arguing the rule from the exception when he relies on such rare cases, as cited above, for his proofs of the organic origin of the petroleum; also in the copper shales of Mansfield, there is as much reason to attribute an organic origin to the copper as to the petroleum; also that in Galicia the petroleum is found in much greater quantities than it is in the menilitic schists, in sands without any fossil fish, and that it is found also in very large quantities, as ozokerite, in parallel, and branching veins cutting lower strata than the menilitic schists; and, finally, that the salt water which exudes with the oil from the mollusks in the Kuban district must also have its origin in the decomposition of the mollusks, according to the reasoning used.

There are a few instances cited in geology of partially decomposed and preserved remains of animal bodies having been found, but these are most exceptional cases, such as a few remains preserved in the antiseptic waters of the peat bogs, or a few frozen remains of Elephas. These exceptions, of course, only confirm the rule, which is, that when there is anything left of animal life in the strata it is the shells or bones, or their moulds or casts, but there is no trace of the flesh or soft tissues to be found, as none of it was entombed.

All that has been written, therefore, about petroleum being derived by distillation or otherwise from the soft remains of animal organisms, whether macroscopic or microscopic, entombed in the strata, cannot possibly have taken place in the natural geological processes, since no such remains were ever entombed in the strata. C. Engler, C. M. Warren, F. H. Storer, S. P. Sadtler and others<sup>1</sup> have experimented and produced hydrocarbons by destructive distillation of organic animal matter, and these syntheses are often quoted by some geologists as very strong proofs in explaining the origin of the natural hydrocarbons in a similar way, but as has been shown above it is impossible to suppose that there could be any similar normal process in nature, since not only the soft parts of the animal organisms were never entombed in the strata, but the sediments in the oil fields were also

never subjected to the high temperatures required for the destructive distillation in such experiments, namely, between 300° and 400°.

2nd.—Now as to the vegetation: Is it not also absolutely and most abundantly proven that vegetation decomposes naturally into the coal series of carbon-compounds, and are not all the members of this coal series found in the sedimentary strata? Nothing more can be asked from vegetation. Are not all the stages, the beginning, the middle and the end of its gradual carbonizing process into peat, lignite, soft coal, semi-anthracite and anthracite right there before us ever since the very beginning of vegetation in Silurian or Cambrian times? Are we to disbelieve what we see to have taken place by the billions of tons during all ages since these most ancient periods, namely, that vegetation carbonized into the coals, and are we to imagine instead that some other unobserved, unseen and mysterious transformation of vegetation into something else, namely, petroleum, took place? This would be to lay aside an abundance of proven facts in order to adopt a mere supposition. The normal process of decomposition of vegetation into coals in nature is in active operation in the world to-day as it has always been, and it is the only one that we can see. It is also the only one of which we have any record in the long history of the geological ages.

As to the other argument that by destructive distillation the petroleum can be obtained from the coals, that would be all very well if nature had distilled the sedimentary strata and the coals or other vegetation in it, but, as a matter of absolute fact, it has not; therefore this line of argument also falls to the ground at once and can be dismissed. If the sedimentary strata had been distilled and petroleum thus produced, there would be no coals anywhere on the globe; we would have nothing but coke beds.

The beliefs in the organic origin of the petroleum leads also to chaos in the understanding of other geological facts and physical laws brought out clearly in the study of many petroleum occurrences or deposits, and no wonder that some geologists who are inclined to believe in this organic origin exclaim, therefore, that the genesis of petroleum is a profound mystery not yet solved by science. For instance:—

1.—It cannot possibly explain the large petroleum fields below the Carboniferous.

2nd.—Neither can it explain the petroleum in the volcanic emanations of to-day.

3rd.—Nor in the volcanic or igneous rocks in all parts of the world.

4th.—Nor in crystalline rocks; in California and New Brunswick, for instance.

5th.—Nor in meteorites.

6th.—Nor in metalliferous veins.

7th.—It is also at a loss to explain why the petroleum fields in every district are found grouped along certain lines, and why the petroleum is found there in many horizons, while outside of the lines in just the same strata, and over much larger areas, all the horizons are barren.

8th.—It cannot explain either how the petroleum can possibly travel out of their supposed organic-remain source in some impervious clay or shale to accumulate in a few porous receptacles far distant laterally and some times hundreds and thousands of feet above, or even below as some assert, and this all through most impervious rocks and without any impelling force behind, or any cracks, joints or fissures to follow since the decomposed products of the organisms must naturally

<sup>1</sup>Bulletin U.S. Geol. Surv., No. 330, pp. 629, 630.

<sup>1</sup>Trans. Am. Inst. Min. Eng., Vol. XXXV, pp. 290, 294.



be supposed to come from the whole mass of the strata through which the organisms were and there could not be fissures, cracks and joints to all parts of the strata.

9th.—It cannot possibly explain why the petroleum, although found to-day in their reservoir rock under strong pressures, cannot by means of that pressure, return and disperse back to their original sources; they should be able to return the way they came, nothing is to prevent them, and there is plenty of pressure for the return voyage if one admits the first voyage from the organic source.

10th.—It cannot possibly explain how the petroleum from the organic remains in the Monterey formation, for instance, in California, got out into the unconformable series above, such as the Fernando formation and the Quaternary, and why these petroleum did not all get out into the air during the long lapses of time marked by the unconformities, and how they were able to get into the lower Eocene and the still lower crystalline rocks, thus working their way against the pressure of their own natural gas, which always increases with the depth.

11th.—It cannot possibly explain again, if the petroleum can travel so freely through the strata as to be able to accumulate under an anticline from organic remains deposited far and wide laterally (at least a mile or two or much more in order to allow for the quantities obtained in many fields), why they did not escape out into the free air only a few hundred, or a few thousand feet away at most; the shales above the sands are not any more impervious than the shales below the sands, which, on that theory, are supposed to be the source of the petroleum, and if they can travel freely through the shales, which are the most impervious rocks of the sedimentary series, I repeat, what is to prevent them from getting out into the atmosphere?

12th.—It cannot account for the continual absence of petroleum in the hard parts of organisms preserved in the sedimentary strata.

13th.—It cannot explain the evident non-connection of petroleum deposits with coal beds.

14th.—It cannot account for the continual association of petroleum with strong salt and sulphur waters. The origin of the petroleum, therefore, is not organic; that it is volcanic is absolutely proven by:

1st.—The fact that volcanic emanations of hydrocarbons are the only natural geological process of petroleum production of to-day, abundantly verified and witnessed in actual operation in volcanic eruptions and phenomena all over the world.

2nd.—By the presence of petroleum in volcanic rocks, igneous rocks, metalliferous veins and meteorites.

3rd.—By the rock pressure of the natural gas in the petroleum deposits. This pressure always increases with depth in each field; it has been well proven that it is not an artesian water pressure from above, and it cannot be explained in any other way than as a remnant or spark of the volcanic energy forcing the petroleum through the crystalline rocks and all the sedimentary strata from below.

4th.—By the products associated with the petroleum in their reservoirs, principally salt, sulphur, hydrogen sulphide, gypsum, calcite, dolomite and silica, which are also the products associated with hydrocarbons in the volcanic emanations of to-day. This association is the unmistakable solfataric volcanic seal which I pointed out before.<sup>1</sup>

5th.—By the hot oils, gases and waters in some of the more recently formed petroleum fields.

6th.—By the fact that the petroleum deposits are located along the faulted and fissured zones of the crust of the earth, parallel to the great tectonic orogenic and volcanic dislocations and in "petroliferous provinces" analogous to the metallogenetic provinces of De Launay, Lindgren, Spurr and other writers. These petroleum deposits could not be inseparably and intimately connected with the tectonic structure of each particular region unless their source was as deep-seated as the forces which have caused these profound dislocations of the crust. We have gradually come to this conclusion in geology in regard to ore deposits similarly connected with tectonic disturbances and hydrocarbon gases and vapors must be added to this class of solfataric metalliferous emanations and receive their proper place in geology as solfataric "petroliferous" emanations. These "petroliferous" emanations have played a most important part in the deposition of ore bodies.

7th.—By this fact that petroleum are never indigenous to the strata in which they are found, and are clearly secondary products impregnating porous rocks of all ages. In all fields there is always a lower horizon in which the petroleum is found, until finally the crystalline rocks are reached, and they are even found in these. This adventitious nature of the petroleum deposits is further illustrated by the deposits of solid petroleum which cut through all rocks in veins exactly similar to mineral veins.

8th.—By the fact that petroleum are found in such abundance in certain small localities, while neighboring localities are found entirely barren; this forces one to the conclusion that they must originate from the volcanic tank below which is the only one adequate to furnish these enormous quantities to narrow, long belts or to small isolated spots, such, for instance, as the one hundred acres of the Spindletop Mound, near Beaumont, Texas, which has already produced about 38 million barrels of oil; such as the one billion barrels produced from a small area in the famous oil field of the volcanic peninsula of Apoheron, near Bakou, Russia; and such as the millions of barrels produced in many other fields from very narrow long belts, while areas, many scores of times larger, next to the producing strips are barren. This cannot be held to be an accumulation in the producing fields from vast surrounding areas of sediments, as if this was supposed one could not explain why the petroleum did not escape to the surface instead of travelling so far laterally.

9th.—By the fact that the sedimentary strata of the oil fields are so highly impervious that the volcanic fracturing and fissuring and the volcanic force of the natural gas alone can explain how so many small porous receptacles at different horizons between these impervious strata, have been filled with petroleum, salt and sulphur waters, and how these small detached petroleum reservoirs are found to-day under a gas pressure which increases with depth in each district, but is, nevertheless, a stored energy which will dissipate gradually in the utilization of the oil field, the volcanic energy which brought it there at one time being now dead and inactive.

Before concluding, permit me to insist on the fact that the recognition of the solfataric volcanic origin of the petroleum not only removes every difficulty in the way of a full comprehension of all the chemical and geological facts established to-day with regard to the nature and mode of occurrence of these products, but it fully harmonizes also with the physical laws governing the circulation of gases and liquids through great



thicknesses of very impervious strata before being able to reach to and accumulate in a few small separated receptacles in the midst of these. The volcanic origin of the petroleum forms, therefore, a complete chain of evidence, with none of the links weak or missing. The very reverse is the case, as I have shown above, when one attempts to explain the origin of the petroleum by means of organic sources; in doing so, well known chemical and geological facts are set aside and ignored and physical laws are distorted and abused. The geologists who still hold these views should seriously reflect on this, and I am confident that if they do they will soon abandon and relegate to the past the old unsupported notion of the derivation of petroleum from organisms, and that they will come to the conclusion that this idea is now unworthy of the progress made by the geological science of to-day.

When one considers that there were produced in the United States alone last year 184 million barrels of oil and fifty-three million dollars worth of natural gas, he can fully appreciate the great economical importance which petroleum has attained. It is essential, therefore, even leaving aside the purely scientific aspect of the question, that the origin of these products should be understood in order to afford a basis or guide for the intelligent exploration of the many new fields yet undiscovered, and which are to supply the world with even vaster quantities of petroleum in the future. The correct understanding of the volcanic origin of the petroleum furnishes us at once, as a matter of fact, with the solution of this problem of how and where to look for new fields; we must follow, as I have pointed out before, the structural or tectonic lines of disturbances and fissuring or the fractured belts along which the solfataric hydrocarbon emanations come up from the interior. The outward manifestation of these tectonic disturbances may be a fissured anticline, as it often is, but the fissuring may also have occurred at any other part of the structural folding of the strata whether in the syncline, at a monocline, along a slope or terrace or any other part of any form of structure. The so-called anticlinal theory, as heretofore explained and understood, namely, as a favorable place of accumulation under an arch of the supposed products of decomposition or distillation of organisms, is abso-

lutely untenable and without any meaning. That such products cannot and do not travel through impervious strata is well demonstrated by the fire damp and choke damp of the coal mines which are always found to-day right in the beds of coal from which they originated. If hydrocarbon gases and fluids could travel through the shales below the producing sands which in this organic theory are supposed to be their source, these hydrocarbon fluids would also travel just as freely through the shales and other strata above the sands and, therefore, would have escaped out into the atmosphere long ago instead of stopping under the anticlines. There is absolutely no difference between the degree of perviousness of the strata above or below the sands, in fact very often a shale which is above a producing sand is also below another producing sand. All these strata are highly impervious, including even the "sands" which are porous only in occasional comparatively small spots. It has been impossible, therefore, for gases and fluids to travel through the strata except when they were fissured by profound dynamic disturbances, which permitted the tremendous volcanic pressure from below to exert itself, and even then the enormously pent up gases and vapors from the interior reached to or near the surface with great difficulty as exemplified by the great differences in pressures of the natural gas in different sands at various levels in a given field, by the fact that pressures of 500 to 600 lbs. to the square inch are often obtained quite near the surface at depths of only 800 to 1,000 feet, yet the gas did not escape; and, by the further fact that oil and gas fields are such small detached pools, never extending but short distances away from the dynamic disturbances which form their original channels. It is only as a part of this broader conception of the occurrence of the petroleum-fields along the profound structural disturbances that the so-called anticlinal theory has any merit. This conception alone explains why some fissured anticlines are "petroliferous" or petroleum-bearing in several of their sands at different horizons, while the great majority of anticlines are absolutely barren of hydrocarbons at all their horizons because they are not fissured folds in "petroliferous provinces."

## MINERAL DEPOSITS OF THE SERPENTINE BELT OF SOUTHERN QUEBEC.

By John A. Dresser, McGill University, Montreal.

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### I. General.

For the past few years practically one-half of the mineral output of the Province of Quebec has been obtained from the area in the Eastern Townships known as the serpentine belt. This is a complex of igneous and metamorphic rocks consisting of peridotite, pyroxenite, diabase and granite, with serpentine and talc schists. It is rather because of the greater economic importance of the serpentine and the fact that it is a rock more easily recognized, than on account of its relative area; that the name serpentine is commonly applied to the group.

These rocks form part of a series which extends, with some interruptions, in a line parallel to the Atlantic coast from Georgia to Newfoundland. In the Province of Quebec they are almost continuous from the international boundary line near Lake Memphremagog to Thetford Mines. Beyond this to the north-eastward they appear frequently for a distance of eighty miles in the counties of Beauce, Dorchester, Bellechasse, Montmagny and L'Islet, and after an interval of some 120 miles they reappear with a large development in the Shickshock Mountains of Gaspé. They are best known in the counties of Megantic,



Wolfe, Richmond, Sherbrooke, Shefford and Brome.

The present output of asbestos comes from the counties of Megantic and Richmond; of chromic iron from Megantic and Wolfe. In each case the County of Megantic furnishes the principal production.

## II. Geology.

The geological relations of the serpentines and associated rocks are not yet very completely known. They are, however, an intrusive series, the latest of which cut sedimentary strata of middle Ordovician age. Some portions seem to be laccolites uncovered by denudation, while others are probably extrusive masses with plutonic rocks in the central portions which pass into diabase towards the sides and top, and have since been deeply eroded. The whole series has been much folded and deformed by regional metamorphism.

The peridotite and pyroxenite are parts of one original mass, which have been differentiated from

have been mentioned. Further field work is necessary to define the precise relations of these rocks. The diabase occupies much the greater portion of the entire belt, and also forms all the higher hills, such as Broughton, Adstock, Ham, Orford and Owls Head Mountains.

A peculiar hornblende granite cuts these rocks with numerous dykes and is otherwise intimately associated with them.

Mineral deposits of importance are found in this district in each of the above-mentioned rocks, except the last. Asbestos occurs in the serpentine; chromic iron in serpentine and peridotite; talc in the pyroxenite; and associated with the diabase there are copper, antimony and nickel.

## III. Asbestos.

Although asbestos was known in the Eastern Townships as early as 1847, it was not until thirty years later that it became commercially important. Work was

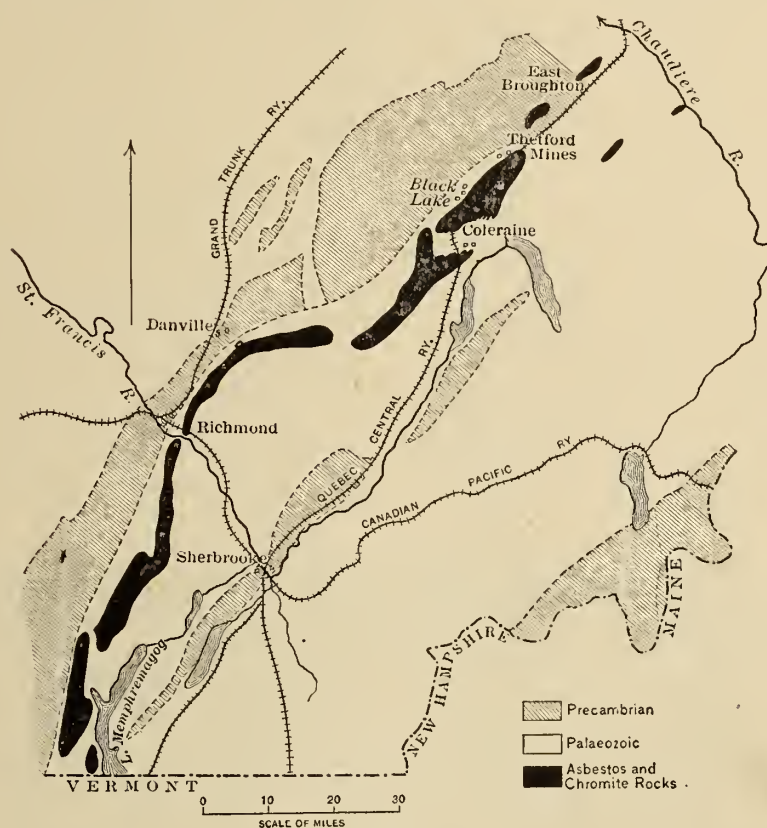


FIG. I.

each other. The serpentine in the Thetford-Black Lake and Danville districts has originated from the alteration of the peridotite. That of the East Broughton and related occurrence has apparently been derived from a and fifteen in width, underlying a great part of the very similar rock, but is in a much more advanced stage of alteration and doubtless is much older. Isolated outcrops of this older serpentine appear at various places in the counties of Wolfe, Megantic and Lotbinière, and are probably portions of a partially uncovered large mass, or batholith, at least fifty miles long dome-shaped hilly country between the Quebec Central and the Grand Trunk Railways in this district. This serpentine is probably of pre-Cambrian age.

The diabase forms a marginal or outer facies of the peridotites and pyroxenites in some parts of the district, but in others it cuts serpentine that is thought to belong to the later of the two classes of that rock that

begun in 1877 at Thetford, and almost at the same time at Black Lake and Danville, and has steadily advanced ever since. The mineral, which is the chrysotile variety of asbestos, fibrous serpentine, requires no description. It has the same chemical composition as the rock which contains it. It is valuable for the property of being incombustible, and that it is a most successful non-conductor of heat and electricity, and well resists most acids. It is used for an increasingly large number of purposes every year, such as stage curtains, fire screens, boiler covering, fireproof roofing and covering, insulating material, etc. The product has hitherto been manufactured in the United States and in Europe, but at present large works for the manufacture of asbestos are being installed in Canada.

1. Production.—Asbestos mining is now the most important mineral industry in the Province of Quebec. During the last thirty years, that is, since asbestos



mining began, the aggregate production has had a value of more than twenty million dollars, and at the present time the Province of Quebec produces between 85 and 90 per cent. of the world's supply. This entire amount, in value two and a half million dollars, is obtained from the counties of Megantic and Richmond, much the greater part coming from the former. The following returns of production indicate the growth of the industry. The production of low-grade material was greatly increased by the introduction of mechanical concentration in 1892-3-4, and the effect is well shown in the statistics which are taken from the returns of the Geological Survey of Canada:—

| Production.          | Value.    |
|----------------------|-----------|
| 1878— 50 tons.....\$ | —         |
| 1879— 300 “ .....    | 19,500    |
| 1880— 380 “ .....    | 24,700    |
| 1881— 540 “ .....    | 35,100    |
| 1882— 810 “ .....    | 52,650    |
| 1883— 955 “ .....    | 68,750    |
| 1884— 1,141 “ .....  | 75,097    |
| 1885— 2,440 “ .....  | 142,441   |
| 1886— 3,458 “ .....  | 206,251   |
| 1887— 4,619 “ .....  | 226,976   |
| 1888— 4,404 “ .....  | 255,007   |
| 1889— 6,113 “ .....  | 426,554   |
| 1890— 9,860 “ .....  | 1,260,240 |
| 1891— 9,279 “ .....  | 999,878   |
| 1892— 6,082 “ .....  | 390,462   |
| 1893— 6,331 “ .....  | 310,156   |
| 1894— 7,630 “ .....  | 420,825   |
| 1895— 8,756 “ .....  | 368,178   |
| 1896— 10,892 “ ..... | 423,066   |
| 1897— 13,202 “ ..... | 399,528   |
| 1898— 16,124 “ ..... | 475,131   |
| 1899— 17,790 “ ..... | 468,635   |
| 1900— 21,621 “ ..... | 729,886   |
| 1901— 32,892 “ ..... | 1,248,645 |
| 1902— 30,219 “ ..... | 1,126,688 |
| 1903— 31,129 “ ..... | 915,888   |
| 1904— 35,611 “ ..... | 1,213,502 |
| 1905— 50,669 “ ..... | 1,486,359 |
| 1906— 60,761 “ ..... | 2,036,428 |
| 1907— 62,241 “ ..... | 2,484,768 |
| 1908— 65,534 “ ..... | 2,547,507 |

2. Distribution of the Deposits.—In the Thetford and Danville areas workable asbestos has as yet been found only in the northwestern parts. The areas of serpentine in these two localities are not connected at the surface, but being lithologically similar and both intrusive, it is probable that they are portions of one general mass, and so are connected at no great depth beneath the surface. The rocks of each of these localities ranges from peridotite, rich in olivine, to pyroxenite, in which little olivine occurs. There is also much diabase in both areas. The peridotite is largely altered to serpentine, but it is in the latter only that asbestos occurs. In the cooling of the peridotite-pyroxenite magma there appears to have been a segregation of olivine towards the northwestern edge of the mass, and of pyroxene towards the southeast side.

The greater part of the entire rock mass is most suitably called serpentine, but much of it carries from 10 to 20 per cent. of pyroxene, generally bronzite, and forms a hard rock, which the miners call “dry” or “bastard” serpentine, or “hornblende rock.” The “heads” or masses of hard rock often met with in the

asbestos mines are of the same character. On the other hand the more pure serpentine which produces asbestos is distinguished by a softness of feel and a more uniformly light colour. The original rock in this case was richer in olivine and poorer in pyroxene, and probably contained less chromite, which is disseminated more or less freely through all of this rock mass.

The distribution of the asbestos-bearing portions of the serpentine, therefore, seems to depend on differentiation in the primary rock, by which a relatively small proportion of it became rich enough in olivine to form a comparatively pure serpentine. While the productive portions are small in proportion to the entire body of serpentine, they nevertheless form asbestos deposits that are practically inexhaustible.

3. Character of the Veins.—The asbestos occurs in gash veins, which rarely reach three inches in width or exceed two hundred feet in length. The great majority are less than three-quarters of an inch wide, and are only a few feet in length. The fibres of asbestos run transversely to the veins, and hence perpendicularly to the side walls. Thin films of iron ore, sometimes chromite, but more frequently magnetite, often form partings in the vein, or coat the ends of the fibres.

4. Origin of the Veins.—The identity in composition of asbestos and serpentine and the evident vein structure show that the material of the veins has come from the side walls. But while all investigators have practically agreed upon the source of the material of the veins, there has been less unanimity in the opinions that have been expressed as to how the veins were formed, and more especially as to the origin of the fissures.

The serpentine is generally much fractured and slickensided along the fracture planes. The late T. Sterry Hunt attributed this in a great measure to the increase of volume which would accompany the change of the anhydrous silicate, olivine, to the hydrous silicate, serpentine. The slickensided fracture planes, however, are less frequently walls of asbestos veins, and consequently this observation does not apply to the origin of these veins.

J. H. Pratt (U.S.G.S., 1904) says that “the original rock in cooling would solidify first along its contact with any included masses of the country rock, that had been broken off during the intrusion of the molten magma. The outer portions of the molten rock would thus cool much more suddenly than the interior portions, and there would be a tendency for them to develop cracks and parting planes. In the alteration of these primary rocks to serpentine, through the agency of aqueous solutions, vapours, etc., there would be perhaps, to some extent at least, a widening of these cracks, but in the end they would be filled with serpentine deposited from aqueous solutions from their walls, and the resulting fibrous structure of the serpentine filling these seams represents the nearest approach to a true crystallization that the mineral serpentine assumes, except when it is found as pseudomorph after another mineral.”

G. P. Merrill, Smithsonian Institution, Washington, D.C., (Mining World, 1905), attributes the fracturing to shrinkage due to the partial dehydration of the serpentine, and also to loss of silica, as has been suggested by J. F. Kemp (N. Y. Acad. Sci., 1901), comparing the veins to the shrinkage cracks in serpentine nodules. He considers the asbestos fibres to have grown from one or both sides of the vein, according as it is an undivided or a divided vein.



R. W. Ells (Bulletin on Asbestos, 1903, Geological Survey of Canada) says of asbestos veins: "In whatever way the fissures were caused, and it is very probable that they have been formed by the great processes of metamorphism to which the rocks were exposed in the change from dioritic matter to serpentine, the vein asbestos appears more naturally to have been produced

were probably formed by shrinkage of the mass, and perhaps in part the crushing action of the same pressure which lengthened and flattened the serpentine areas, and at the same time made the associated rocks schistose. The asbestos appears to the writer to have been deposited in the cracks under great pressure from superheated waters which, penetrating the rock, ab-

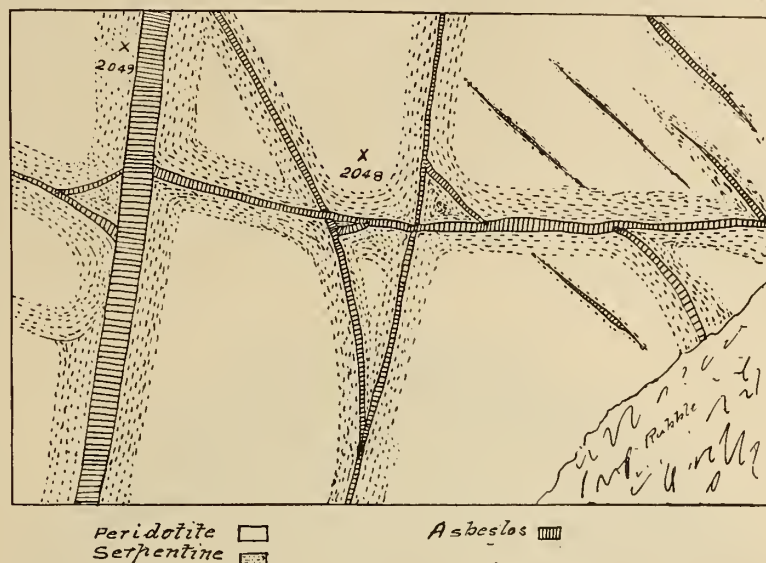


FIG. II.—Diagram showing asbestos and serpentine in peridotite. The largest vein is two inches wide.

by a process of segregation of serpentinous matter from the sides of the fissures very much as ordinary quartz in mineral veins is known to have been produced."

F. Cirkel ("Asbestos, its Occurrence, Exploitation and Uses," Department of Mines, Ottawa, 1905) agrees in part with Messrs. Merrill and Kemp, but considers

sorbed the material of the serpentine until the solution became a saturated one. With cooling, the mineral would be deposited in the cracks. . . . In the Thetford and Black Lake areas, masses and dykes of granite have been intruded into the serpentine, and these probably account for the necessary pressure and heated waters to form the asbestos there."



FIG. III.—Showing veins of asbestos within band of serpentine on weathered surface of peridotite.

a part of the fracturing to have been caused by the intrusion of granite dykes, which are numerous in the district. He also considers the veins to have been successively filled from the side walls.

A. P. Low (Geological Survey of Canada, 1906, The Chibougamou Mining Region) says: "The cracks

An important feature of asbestos veins that seems to have been generally overlooked is that the wall rock adjacent to the vein is always completely reduced to serpentine, while the general mass of the country rock is usually not so far altered. In all the deposits, except those of the East Broughton type, the asbestos-bearing



rock is only partially altered to serpentine, except along the asbestos veins, and here the alteration appears to be invariably complete. A band of pure serpentine extends on each side of the asbestos vein to a width generally about three times that of the vein. Measurements were taken on forty-nine veins in the Bell and Johnson mines, and the average ratio width of the asbestos vein to the total band of asbestos and bordering serpentine was 1:6.6, seventeen of the forty-nine measurements practically coinciding with this average. The serpentine border is not easily noticeable in fresh rock, but is very conspicuous on the faces of workings which have had fifteen or twenty years' exposure to the weather, and can often be well seen on unworked surfaces (Figs. 2 and 3).

The veins occur in the joint planes of the original rock, in fractures produced by regional metamorphism, and often in the crevices formed when shells are being

mon in the veins, would thus be the beginning of the vein, and chrysotile crystals by growing outward on either side would thus have formed the wider veins as the serpentinization of the wall rock advanced. The asbestos can only have been formed after the serpentinization of adjacent parts of the rock.

Pratt (op. cit.) observed that "It is probable that this chrysotile asbestos may have been formed some time before the complete alteration of the primary rock into serpentine. This is emphasized by the fact that in the southern part of the United States, where these magnesian rocks have been but partly altered to serpentine, seams of chrysotile asbestos are occasionally found almost entirely enclosed by a peridotite rock which is altered but little to serpentine." In the case shown in Fig. 2, a microscopic examination of the rock from the two portions marked No. 2048 and No. 2049 showed the latter to be wholly serpentine, the former



FIG. 1V.—Photomicrograph of specimen 2048. Rock about 90 per cent. olivine. Olivine grains surrounded by narrow rims of serpentine, a vein of asbestos, and a crystal of pyroxene.

cast off rectangular blocks as in weathering. All three types of fissures are indicated by the veins in Fig. 2, which is a drawing of a wall of a pit near the Standard mine. At the junction of two veins, one, usually the wider, sometimes cuts the other distinctly, but more frequently they coalesce with a short line of division between them, masked by a film of iron.

While the veins run in all directions through the rock, the larger veins are usually those along joint planes. Of these the horizontal series, which are sometimes over two inches wide and extend for 100 to 200 feet, could never have been open fissures, nor is it conceivable that small areas of rich ground occasionally found where there may be 12 or 14 per cent. of asbestos could ever have had as many open fissures as they now have filled veins. It therefore seems most probable that a process of replacement of the wall rock has gone on contemporaneously with the deposition of the asbestos. The film of iron ore, or the parting so com-

a fairly fresh peridotite. Figs. 4 and 5 show microphotographs of these sections.

At East Broughton and other localities on the older serpentine, the entire rock is of the character of the vein borders at Thetford.

The entire rock being serpentinized, the proportion of veins is large. Asbestos seems to have reached its maximum development which from the measurements made at Thetford would represent nearly one-seventh or upwards of 15 per cent. of the serpentine. But this rock has passed its maximum stage of productive value for an alteration of the larger veins has begun, by which the fibres of asbestos are partially replaced by calcite. Their flexibility and tensile strength being gone, they are no longer products of value. The best asbestos of this locality seems to be in the smaller veins. The rock is exceedingly soft, and the proportion of vein matter is so great that practically all of the rock mined goes to the mill. The fact that the asbestos



is of better quality in the narrow veins than in the larger ones appears to corroborate the view that the asbestos veins are gradually formed. Beginning along the joint planes, they extend to all parts of the rock as fracturing from any cause opens it to the action of metamorphosing agencies, principally water. These have reduced it first to serpentine; second, to asbestos, and lastly, forming a sort of ophicalcite.

Mr. W. S. Johnson states that veins of asbestos partially replaced by calcite are occasionally found at Coleraine. In that case, the Thetford area may be regarded as having reached the maximum productive value for asbestos.

According to the measurements mentioned above, this should be nearly 15 per cent. While this is in excess of the actual production of the rock as a whole, small very productive parts probably reach 12 to 14 per cent. occasionally, which, allowing for loss in recovery, accords fairly well with the results of the limited

the serpentine. It forms isolated masses of even grain, is separated from the serpentine by intermediate rock matter and seems, from such evidence as is available, to be an extreme differentiation product complementary to the very basic peridotite. This view, which is as yet only tentatively advanced owing to lack of sufficient field study, seems also to be corroborated by the fact that the granite is less frequently found in parts of the rock rich in pyroxene than in those having much olivine.

(To be continued.)

#### OUR SUBSTITUTE FOR TIMBER.

Abstracted from article by Prof. M. B. Baker, in Queen's Quarterly.

Notwithstanding the fact that our supplies of building timber are rapidly disappearing, little provision is



FIG. V.—Photomicrograph of specimen 2049. Serpentine and a few grains of chromite.

number of measurements on which this estimate of possible proportion of asbestos to serpentine is based.

5. The Granite.—The presence of granite in dykes or other forms has been considered by many to be favourable, if not necessary, to the occurrence of rich asbestos ground. Yet in the older serpentine at East Broughton the recent development of numerous areas now rich and formerly much richer, has not, so far as the writer is aware, disclosed any granite in that district. It would not, therefore, appear to be necessary to the existence of asbestos.

Where the granite is intrusive, as in parts of the Thetford and Danville districts, the effect in fracturing the serpentine is highly probable, and the influence of heated waters accompanying the intrusion, as suggested by Dr. Low, is likely to have hastened the process of serpentinization and the consequent formation of asbestos. But much of the granite appears to be nearly, if not quite, contemporaneous with the parent rock of

being made to supply a substitute. However, the demand for timber is not likely to increase so rapidly in the future as people think. Timber was formerly the chief structural material of all buildings, but is rapidly being replaced by steel, concrete, and clay products.

Stone and concrete are almost always used in the foundations of large buildings. The superstructures are either steel bridgework or reinforced concrete. The uprights, girders, joists, etc., are built to carry all the load, and some light fireproof material is used to fill in the spaces between the more substantial structures. In Canada the material used is usually clay, of which we have an endless supply.

The manufacture of clay products is probably the oldest industry on earth, but new developments are constantly being made nevertheless. One of the most recent of these is the manufacture of "clay-lumber," or "terra-cotta lumber," as it is often called. It is so-



made that nails, screws, bolts, etc., can be driven into it with ease, and it may therefore be put to many of the uses to which timber is now suited.

When clay is heated to a temperature of about 1,800 degrees it begins to fuse, and the particles weld or knit together, and the clinker when coiled assumes a hard rocklike consistency. In the manufacture of clay lumber the raw clay is mixed with some combustible substance, usually sawdust, and sufficient water to make a stiff mud. This mixture is then put through an auger machine, which consists of a hollow steel barrel about the shape of a cannon, within which an auger is turning, thus constantly forcing the clay towards the muzzle of the machine. Dies of any desired shape are bolted onto the muzzle of the machine, and as the clay is forced out it must of necessity take the shape desired. The clay issues as a long column, which can be cut off into blocks of proper size by means of fine wires set on a frame. By changing the dies to suit the architect's plans, any shape of block may be made suitable for domes, arches, ceilings, etc. When the products are sufficiently dried they are placed in a kiln, and the sawdust or other combustible, mixed with the clay, will burn out, thus helping to distribute the heat, and at the same time producing a light, porous, and fire-proof block.

For walls and partitions this clay-lumber is made in the form of hollow blocks, which have many other advantages, besides being light in weight. The air space within the blocks keeps the building cooler in summer and warmer in winter, and also deadens the noise from surroundings. Owing to the porous character of the blocks, one can plaster and finish walls and ceilings without first lathing them; but if one wishes to finish with lumber of any particular kind he can nail into this clay-lumber almost as easily as into timber.

Another class of hollow blocks differs from the porous, in that they are made entirely of clay, with no addition of sawdust or other combustible material. They are in reality hollow rectangular tile, and being free from pores are stronger, and able to carry a much greater load. They are usually made 8 inches deep by 10 inches wide, and 12 to 16 inches long. They have two or three partitions inside to give greater strength, the material of the walls and partitions being an inch thick. These blocks have long been used for foundations of frame houses, barns, stables, and frame structures in general. They build up a wall very quickly, and, being hollow, they offer a warm, dry, cheap form of masonry for foundations of frame buildings.

Enquiry among men from all Canada who would be most likely to know, failed to bring forth a single case where lightning has struck a building placed on these blocks.

Porcelain, which is used largely as an insulator, is simply a burned clay, as are the blocks described above. It is therefore possible that those hollow porcelain-like blocks do actually insulate a building from the earth, and thus leave it out of a possible electric circuit.

### WASHING BLAST FURNACE GAS.

On this subject the "Allgemeine Ingenieur Zeitung" has an interesting article, which, in view of the rapid introduction of large gas motors in connection with blast furnaces in America as well as in other countries, should prove of interest to a large circle of readers.

The purification of the gas before it enters the

working cylinder of the motor is one of the main conditions necessary to secure reliable working of the plant. Before the gas motor was brought into use blast furnace engineers paid little attention to washing the gas, as this seemed hardly necessary for its employment in the Cowper regenerators. A few dust catchers in the pipes seemed enough to do away with the necessity of frequent cleaning out of the regenerators. This is, however, not the case with motors where those parts that are subject to the action of the gas are exposed to considerable friction when at work at high temperatures. The great heat of explosion bakes the solid impurities on to the cylinder walls, etc.; the dust particles form with the lubricating oil a specially adhesive gummy mass, which is driven out with the combustion gases. But at the edges of the exhaust orifice there remains a great part of these substances, because it cannot keep up with the velocity of the gases. If we consider a gas motor of 500 h.p. using hourly 3.5 cubic metres, or say 123 cubic feet of gas, per horsepower, we have every hour 1,750 cubic metres, or say 61,250 cubic feet of gas passing through the machine; and if there is only one gram of dust per cubic metre, or say roughly 0.3 grains per cubic foot, we have every hour 1.75 kg., or 3.85 lbs. That at least one-fifth to one-fourth of this remains attached to the exhaust opening, can be seen by anyone who has to do with a motor working with unpurified gas, as every few hours he must remove this deposit. This latter closes the exhaust opening, and as a part thereof is sucked back by the piston into the cylinder, it injures the working surfaces. This shows that purification must be carried out to a degree which will leave less than one gram per cubic metre, or 0.3 grains per cubic foot; and in delivering motors the makers generally specify that the gas shall not contain more than 0.05 to 0.07 gram per cubic meter, or 0.015 to 0.021 grains per cubic foot.

The gas washers most in use can be classified in two groups. In the older of the two the gas is driven through a series of filtering vessels, containing for convenience a number of drawers, which may be taken out for emptying. The filtering material is usually coke, sawdust, or the like. The second class is of more recent construction, and well known under the name of rotary gas washers. The gas is passed through the jacket of a centrifugal apparatus, while the inner wall is covered with trickling water. The gas flows in the opposite direction to the latter, so that there is friction between the finely divided water and the whirling gas current.

The high degree of purification which can be carried out to a few milligrams of dust per cubic metre is due to the fact that the water forms a nebula which surrounds the finest grains of dust, and by increasing their weight, makes them more subject to the centrifugal action. Water and dust are thrown out together by the machine. To attain the highest possible degree of perfection by this method it is advisable to set the rotary gas-washer near the blast furnace, and even to insulate the pipe between the furnace and the washer, so that the gas shall not lose any of the heat necessary to evaporate the water.

The essential difference between the first-named class of purifiers and the rotary washers is that the first cost nothing, except for the material to fill the drawers and the labor to remove them, whereas the latter, exerting a suction action, call for considerable power to drive them. Further, they demand more



labor and are more expensive to keep up, so that very often it is found that the dry process is much cheaper than the washing. Outside of this, they need no provision for the removal of the water.

In the case of coke furnaces, and in general everywhere where the gas contains considerable water, only the dry process can be employed, as these very thoroughly remove this material from the gas. Of course, where the gas is not rich in tar, this makes no difference.

To get the advantage of both methods of purification, it is recommended so to construct the dry purifiers that they shall produce the same effect as that carried out in the rotary washers. This is done by building above the cylindrical purifiers a hopper-shaped reservoir, in which the gas current is led, and after

the latter has attained at the lower end a certain velocity, steam is driven through it. In the lower end of the hopper or funnel there is a spiral such as is found in grain cleaners and in some steam-drying apparatus. In this spiral the steam will have the same result as in the rotary washers.

It is to be remarked in this connection that to overcome the resistance in the spiral, neither increase of blast pressure nor the use of an exhaust fan is necessary. The steam, which is mixed with the gas at the end of the funnel, acts by its expansion like an injector—or rather ejector—and gives the gas the necessary increased velocity to enable it to flow through the spiral. After leaving the latter, the steam, mixed with the dust, is led into a condenser cooled by air, whence it is discharged as water.

R. G.

## BOOK REVIEWS.

**Principles of Mining: Valuation, Organization, and Administration; Copper, Gold, Lead, Silver, Tin, and Zinc.** By Herbert C. Hoover. 199 pages. Illustrated. Price \$2.50 net. Hill Publishing Company, 505 Pearl Street, New York.

Few individual phases of mining have not been touched upon in the writings of modern technologists. Specific problems have been debated and settled and reopened. From power economy to slime treatment, every step in the winning and reduction of gold ore has served as a crystallizing point for numberless expositions. Only less expounded are the mining processes of copper, lead, silver, tin and zinc.

But underlying these commercial processes are certain principles common to all. The proper understanding of these is a pre-essential to intelligent mining engineering. Mr. Hoover's book is written with the object of defining and illustrating these principles.

Before expressing an opinion on Mr. Hoover's method of handling his wide subject, let us glance at the general anatomy of the book itself.

The twenty chapters that make up the volume may be grouped thus: Six are given to "Mine Valuation"; three to "Development of Mines"; one to "Stoping"; one to "Methods of Supporting Excavation"; three to "Mechanical Equipment"; one to "Ratio of Output to the Mine"; three to "Administration"; one to "The Amount of Risk in Mining Investments," and a concluding chapter to "The Character, Training and Obligations of the Mining Engineering Profession."

Strict logic might demand that the last chapter be given first place. Otherwise there is no fault to be found with Mr. Hoover's arrangement of subject.

The author excludes from his consideration alluvial deposits, iron, coal, and all other mines except those in which the ores of the metals mentioned in the title are won. This differentiation strikes us as being arbitrary. For instance, on page 1, the following principles are given as forming the basis of the value of a metal mine:

- (a) The profit that may be won from ore exposed.
- (b) The prospective profit to be derived from extension of the ore beyond exposures.
- (c) The effect of a higher or lower price of metal (except in gold mines).
- (d) The efficiency of the management during realization.

These principles need no modification to become applicable to all types of mines and only slight changes will adapt them to the exploitation of alluvial deposits. We regret, then, that Mr. Hoover has not made his book more complete by including the vitally important coal and iron branches of mining. This by the way.

Comment upon a few typical passages, chosen more or less at random from successive chapters, will serve to convey a rough impression of the character and style of "Principles of Mining."

On the the first pages some truths that will always stand iteration are emphasized. ". . . it is utterly impossible accurately to value any mine, owing to the many speculative factors involved. The best that can be done is to state that the value lies between certain limits, and that various stages above the minimum given represent various degrees of risk" This is true. But it is also true that the fact that a mining risk is different from ordinary commercial risks does not mean that the former is necessarily higher. Speculative factors abound in everything from religion to street cleaning. Life insurance is highly organized speculation. The artist speculates in human sensibilities; the novelist, in human sentimentality; the broker, in human frailty. Heretofore it has been the almost invariable custom of writers to refer to mining risks as carrying an essential and not an incidental speculative element. Books like Mr. Hoover's will be most effective in rectifying this error. Nevertheless, Mr. Hoover himself appears to have accepted the current idea.

Mine valuation is abundantly treated. On page 4 it is pointed out that the treatment on a considerable scale of sufficient test parcels of ore is the ideal method. But such a method consumes time, opens many channels for fraud and is often either prohibitively expensive or physically impossible. Sampling and assaying are therefore the usual and accepted methods for determining the value of standing ore.

After developing this idea, Mr. Hoover makes some most sensible remarks on sampling. "The whole theory of sampling is based on the distribution of metals through the ore body with more or less regularity, so that if small portions, that is samples, be taken from a sufficient number of points, their average will represent fairly closely the unit value of the ore. . . . How frequently samples must be taken, the manner of taking them, and the quantity that constitutes a fair sample, are matters that vary with each mine. So much de-



pend upon the proper performance of this task that it is in fact the most critical feature of mine examination. Ten samples properly taken are more valuable than five hundred slovenly ones. . . . Given a good sampling and a proper assay plan, the valuation of a mine is two-thirds accomplished. It should be an inflexible principle in examinations for purchase that every sample must be taken under the personal supervision of the examining engineer or his trusted assistants."

This is a lengthy quotation; we would like to quote as much more. From the above, however, the reader may observe the colour and tone of the chapter. The section on sampling includes many general hints that are the fruit of ripe and right experience. There follow, next, sections and chapters on calculations of averages and of quantities of ores, classification of ore in sight, extension in depth, depth of exhaustion, recoverable percentage, cost of production, redemption of capital and interest, valuation of mines with little or no ore in sight, valuations on second-hand data, general conduct of examinations, and reports. This concludes that part of the book assigned to the general topic, "Mine Valuation."

It is not seemly to do much more than express our warm approval of the crisp, capable and accurate treatment that the author gives this theme. One digression will, we hope, be pardoned. On page 56 there is a paragraph on mining engineers' reports that is temptingly quotable. It gives clear expression to views that should be more generally held and acted upon. It leaves no room for the mere "opinion" of the genuine engineer, nor for the resounding periods of the pretender. Here is part of it:

"Reports are to be read by the layman, and their first qualities should be simplicity of terms and de-

finiteness of conclusions. . . . The essential facts governing the value of a mine can be expressed on one sheet of paper. It is always desirable, however, that the groundwork data and the manner of their determination should be set out with such detail that any other engineer could come to the same conclusion if he accepted the facts as accurately determined. . . . The wise engineer will put before his clients the scale, the weights, and the conclusion arrived at. The shrewd investor will require to know these of his adviser."

Under "Development of Mines," such matters as entry to the mine, tunnels, location of shafts, speed of sinking, crosseuts, drilling, etc., etc., are given practical consideration. Tabulated working costs are given by way of illustration and numerous diagrams are inserted. "Stopping" has a chapter to itself, as also has "Methods of Supporting Excavation." "Mechanical Equipment" is very fully discussed. Administration, volume of output, the amount of risk in mining investments, are concluding subjects. The last chapter, "The Character, Training and Obligations of the Mining Engineering Profession," will be the text for editorial comment at a later date.

Already Mr. Hoover's new book has had a wide sale. This is not the least acceptable form of approval. The title, "Principles of Mining," is inviting. The book itself is not disappointing. It argues well for the author's literary perspective that he has been able to confine himself to a modest two-hundred-page volume. This means that he has skilfully avoided diffuseness, verbosity, and unprofitableness of that kind. Whether he has or has not been guilty of serious sins of omission we are not prepared to say. He has given the reading public a readable book that should have a large influence for good with engineers and investors alike.

## EXCHANGES.

**The Mining World, May 15, 1909.**—"Tin in the Black Hills of South Dakota" is the title of a paper by Jesse Simmons. In the year 1877 Prof. Richard Pearce recognized cassiterite in black sand sent him by a placer miner operating in the Black Hills. Since that time the possibility of discovering tin in workable quantities has never been absent from the thoughts of Black Hills miners. Many abortive attempts were made to exploit the Black Hills deposits. In 1891 the Harney Peak Co. was organized. After squandering several millions of dollars, this company, which was supplied with a large amount of British capital, was placed in the hands of a receiver, Dr. A. R. Ledoux. Dr. Ledoux has gradually weeded out the worthless claims, and patented the more valuable. Under his careful administration the whole enterprise has been reorganized. A sufficient amount of capital for development and equipment of the mines has been placed in Dr. Ledoux's hands, and, under his direction, work has been commenced again. The tin veins of the Black Hills are of typical granitic character, undoubtedly of eruptive origin, following closely the bedding planes of the enclosing schists. Usually the veins are lens-shaped, successive lenses occurring upon the line of strike. Many of the veins are of a true vein or tabular form, and can be traced for thousands of feet. They vary greatly in width, sometimes a few inches, and from that up to 100 feet or more. The cassiterite occurs irregularly, and is more evenly distributed through the veins from wall to wall;

but apparently lies in zones or sheets that do not appear to have any definite relation to either wall.

The veins are composed of typical gneiss, or granite with the feldspar wanting. They nearly always carry considerable percentages of columbite, tourmaline, and mica.

**Mining and Scientific Press, May 15, 1909.**—D. H. Stovall contributes to this issue a paper on blasting and preparing the shots. In the opening paragraph he refers to a mine superintendent who has made it a practice to question every miner he employs regarding his familiarity with blasting. This preliminary has helped to do away with many accidents.

**Economic Geology, April, 1909.**—In an article entitled "Some Features of the Alaskan Tin Deposits," Adolph Knoff touches upon some of the difficulties encountered by those who prospect for that metal in Alaska. The American prospector is not familiar with tin ores and tin mining. As tin-bearing rock occurs throughout the region in a great variety of ways, his perplexity is increased. Many locally occurring minerals are easily confounded with cassiterite, which itself is a difficult mineral to identify with certainty. The following species have been mistaken for cassiterite: garnet, black tourmaline, the porphyritic augite



of some quartz porphyry dikes, pyroxene in contact-metamorphosed limestone, smoky quartz, vesuvianite, magnetite, and wolframite. The belief that stannite is a highly desirable ore of tin has occasioned useless prospecting, certain sulphides, principally pyrrhotite, being mistaken for that mineral. Another widely accepted idea is that tourmaline is an infallible indication of tin ore. This belief has arisen because of the occasional resemblance between the two minerals, and also because of their close association in tin deposits in other countries. But the conclusion is unsafe.

The sedimentary rocks of the tin region comprise chiefly limestones and slates, overlain conformably by a great volume of thin-bedded, dense-textured Ordovician limestone, which generally shows no evidence of metamorphism. Four stocks of quartzose, orthoclase granites, of coarsely granular porphyritic habit, are intrusive into the limestones. Greenstones of diabasic character are common in the slate area near York, and are, apparently, intruded sills. The youngest igneous rocks are narrow basalt, dikes are found cutting both limestone and granite.

The granites have invaded the various series of limestones and produced an extensive development of lime-silicate rocks, limited as a rule to a narrow zone encircling the granite masses.

Tin ore occurs in both lode and placer form. Cassiterite is the only mineral that is likely to prove of economic value, stannite and the two new magnesian iron-tin borates being probably not worth exploitation. Cassiterite occurs in Seward Peninsula in a variety of ways, only two of which are standard modes of occurrence. These are, first, in tourmalinized margins of granite masses and granitic dikes, and, second, in quartz veins cutting granite and accompanied by impregnation of the wall rock.

**Mines and Minerals, May, 1909.**—The leading article in this number of *Mines and Minerals* is a description of the equipment and work of the Technical Branch of the U. S. Geological Survey. The Fuel Division has now been moved to Pittsburgh, where investigation is being conducted in the direction of fuel economy, producer gas, coking, washing, briquetting, and other lines. The inspection of fuels is another important branch. Mine-accident and mine-waste investigations are given special attention. The mine-explosion, research work and rescue-apparatus training are directed by Mr. J. W. Paul. Two or more sets of each kind of rescue apparatus have been purchased and are in use at the Pittsburgh station. The object of this installation is entirely educational. From two to six men are always in training under Mr. Paul. Eight hours per day are devoted to each man's instruction for two weeks. The men are selected by the coal companies, and are sent to the station and maintained there at the expense of the coal companies. After completing their period of training they are expected to return to their places of work and there act as leaders in imparting instruction in rescue-work.

#### PERSONAL AND GENERAL.

Mr. O. N. Scott has returned to Toronto after an extended professional visit to Cobalt.

Mr. R. Livingstone, late Assistant Mines Inspector of Alberta, has been appointed Chief Inspector in place of Mr. Norman Fraser, resigned.

Mr. F. A. Ross, manager of the Daly Reduction Co., Hedley, B.C., has gone to New York on a business visit.

Mr. Frank Ross, of Quebec, and Mr. W. D. Ross, of Toronto, have been elected directors of the Nova Scotia Steel Company.

Mr. J. W. Astley, of Victoria, B.C., is on a trip to Cobalt and Gowganda, with a view to following professional work there.

Prof. William Nicol, of the School of Mining, Kingston, has offered to give \$40,000 for the erection of a new mineralogy building.

Capt. W. H. Jeffrey, of the McKinley-Darragh mine, Cobalt, is taking a two weeks' business trip to Toronto, Cleveland and Cincinnati.

Dr. Milton Hersey, of Montreal, has given \$10,000 to the metallurgical department of the faculty of Applied Science of McGill University.

Mr. Norman Fraser, formerly Inspector of Mines of Alberta, has been appointed superintendent of the Crow's Nest Pass Coal Company's Michel colliery.

Mr. J. B. Tyrrell has moved his office from 9 Toronto Street to lighter and more commodious rooms in the Confederation Life Building, Richmond Street East, Toronto.

Mr. Rex Taylor has been appointed manager of the Right of Way mine, succeeding Mr. Joseph Houston, who resigned recently to take charge of the claims owned by Messrs. Sifton and O'Brien.

Mr. A. R. Wilson has resigned as superintendent for the Maple Leaf Coal Company, Frank, Alta., having been appointed a coal mine inspector by the Government of Alberta for the district east of Lundbrek.

Prof. Emmons, of Boston, Mass., one of the most distinguished members of the United States Geological Survey, paid a visit to Cobalt recently, accompanied by Mr. Benj. Lawrence, consulting engineer of the Kerr Lake mine.

Messrs. R. M. Atwater, Jr., Robert Linton and R. de Sallier have been examining the Dominion Copper Company's mining properties in the Boundary district for the protective committee of dissenting stock and bond holders, who are opposed to the reorganization scheme of the majority.

## Industrial Notes.

**Westinghouse Distributing Transformers. Circular No. 1502, April, 1909. Westinghouse Electric and Manufacturing Company, Pittsburgh, Pa.**

All of the Westinghouse publications are of a high order of merit. This one is no exception.

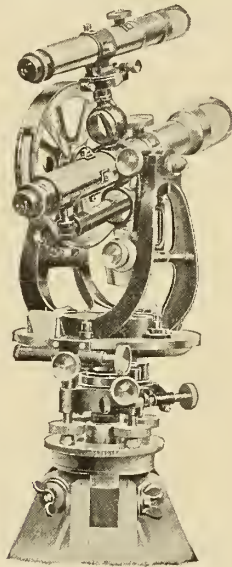
Electrical energy for light and power service is supplied to the customer at several nominal voltages. Different distributing voltages create a demand for transformers of various transforming ratios. Sometimes customers are found near high voltage feeder lines exceeding 16,500 volts. In such cases it pays to install a single transformer of suitable voltage ratio.

All distributing transformers must operate under very severe conditions. Therefore the design and construction are vital considerations. The catalogue before us throws ample light upon these subjects.



The circular contains much valuable information on alternating current distribution covering transformers, lightning arresters, insulators, cross arms, etc. Considerable space is devoted to underground and overhead construction applicable to congested and scattered districts. There is also given information on potential regulating systems. The circular contains 52 pages of information of value to any central station man or any other connected in any with the distribution of power by alternating current lines.

### A NEW MINING THEODOLITE.



Ainsworth's New Theodolite.

Wm. Ainsworth & Sons, Denver, Colorado, U.S.A., have just placed on the market a new theodolite for mountain and mining work, as shown in the illustration herewith.

By the use of the hardest bronze alloys the weight of this instrument has been reduced to a minimum without sacrificing rigidity, and the U or theodolite standard, the merits of which are now well recognized, is so designed as to admit of placing a  $2\frac{1}{4}$  inch compass in the centre, which is sufficient for checking.

It has a  $4\frac{1}{2}$  inch limb and vertical circle with edge graduation, 8-inch 20-power main telescope, 7-inch 18-power auxiliary telescope with counterweight that may be used either as a top or side telescope, 4-inch 30-seconds telescope level, stadia, gradienter, magnetic variation circle, 4-screw leveling head and extension tripod. The instrument only, weighing but nine pounds, complete with all attachments.

The limb verniers are placed at 30 degrees with the line of sight, which together with the edge graduation on the vertical circle enables an operator to read both vertical and horizontal angles from the one position.

The telescope tubes are finished in an improved manner, insuring perfect collimation for all distances. Only the highest grade lenses ground according to the latest formula, are used. The telescope axis has the usual grooved bearings common to all this firm's instruments, the merits of which are now well recognized.

The leveling head is of improved design and accurately constructed so that it cannot be cramped in any position, which greatly reduces the wear on the leveling screws and renders it unnecessary to loosen all of the screws when leveling up. The plumb centre has a movement of half an inch to permit locating plumb bob over point.

The graduations are, with the exception of the compass circle, on solid silver and produced in their new 30-inch automatic dividing engine, which machine, it is claimed, is capable of producing automatically circles accurate to within one second of arc.

The instrument is fully described in their catalogue, BX-16, just issued.

## SPECIAL CORRESPONDENCE

### NOVA SCOTIA.

Glace Bay.—Now that the shipping season is fairly under way and all the collieries are working steadily, the unrest among the mining population which has been caused by the active propaganda of the U. M. W. A. has largely disappeared. The mines are working full time and obtaining good outputs, although the production remains below that of last year. The Dominion Coal Company's output to the end of May, 1908, was 1,585,364 tons, whereas to the end of May this year it will not exceed 1,260,000 tons, a decrease over the period of approximately 325,000 tons.

It was stated by the U. M. W. A. leaders that President Tom Lewis would visit Cape Breton somewhere around the 24th to review the situation and strengthen the hands of the propagandists, and preparations were being made to impress the public by means of a demonstration and procession of the U. M. W. A. following. It is now stated that Mr. Lewis is not likely to visit Cape Breton in the near future. Indeed, it is quite possible that the P. W. A. may take the aggressive and invade the territory of the U. M. W. A. A good many of the miners in the West are more than a little disgusted with the manner in which their affairs

have been run by the officers of the U. M. W. A., and the miners at Crow's Nest Pass, for example, do not view with overmuch relish the extraordinary levies that are being made upon them to support the useless strike that is being carried on by Mr. Sherman. The question of joining the Western Federation of Labour has been discussed among these men, but a good many of them come from Nova Scotia, and they are wishful to affiliate with the Provincial Workmen's Association, or at least to model their unionism upon this pattern. It would almost seem as if the time were ripe for Canadian miners to follow the national lead and assert their unity as a body of specialized workers forming part of the Canadian nation. As we have stated before, the U. M. W. A. is a body composed largely of reactionaries, and is many years behind the spirit of the times in Canada. The Canadian legislator does not seek the advice of Washington, nor need the Canadian miner seek the leadership of Indianapolis. We think that everything in Canada should partake of the national spirit, and labour unionism is not an exception to the rule.

**The New Mines of the Dominion Coal Co.**—The Dominion Coal Company are now very actively proceeding with the opening up of their large coalfield in the Lingan-Victoria Basin.



Dominion No. 12 is now to be classed as a producer, and within two months will be putting out between 400 and 500 tons a day. The new bankhead is all completed and the machinery has had several trial spins. All the colliery buildings are complete, and the underground development is well advanced. This mine is to be worked by the "room and pillar" system, the coal being hauled to the levels by back-balances, or gravity haulages. The pitch of the seams is greater than on the Glace Bay side, and it is probable that this system will be followed at all the projected mines in the Lingan Basin. One effect will be to lessen the number of horses required.

Dominion No. 14 is now at about the same stage of development that No. 12 was in at this time last year. The construction of the permanent bankhead is proceeding, and it is anticipated that No. 14 will become a producer in the summer of 1910.

The site of No. 15 is now fixed, and the work of developing the slopes will be commenced this month. The temporary plant will shortly be moved from No. 14 to No. 15, and it is expected this mine will be in a position to commence permanent construction in the spring of 1910.

**The McGill Summer School of Mining.**—About 22 students from the Mining Department of McGill University have visited the Glace Bay mines during the week ending the 15th, under the guidance of Dr. Porter. The young men were distributed around the collieries, and must have greatly profited by what they saw. It is not often that a mining student has the opportunity of seeing an entirely new group of collieries under construction, and there are a good many features of special interest around the Glace Bay mines.

**Steel and Coal.**—The Dominion Coal Company's accountants are now examining into the unpaid portion of the claim of the Dominion Iron & Steel Company under the recent decision of the Court of Appeal, with a view to the final settlement. Under the arrangement made between the two companies the figures of the claim are subject to confirmation by actual examination of the Steel Company's book and vouchers.

Under the much-invoked contract the price to be paid by the Steel Company to the Coal Company for coal is subject to revision at the end of each five year period. The first revision will fall due on the 1st of July next. The cost of mining, owing to increased wages and the enhanced prices of materials, has very largely increased in recent years, and the effect of the contract provisions will be to make the price of coal to the Steel Company for the ensuing quinquennial period higher than the price which was agreed upon for the first five years of the contract.

**The Nova Scotia S. & C. Co.**—It is understood the executive officers of the Nova Scotia Steel & Coal Company who have been in London for some time in connection with the raising of new capital, have been successful in their mission, and that the new financial scheme will be placed before the shareholders on the return of these gentlemen from England.

The Department of Labour have not as yet granted the request of the U. M. W. A. for a Board of Conciliation to adjust alleged grievances at the No. 3 Colliery of the N. S. Steel Co. It is understood the department awaited the return of the Steel Company's directors before granting the application. One of the grievances urged by the U. M. W. A. is the introduction of safety lamps without compensation to the miner for their use. It would seem more in order to ask for a commission in lunacy to inquire into the sanity of men who urge the introduction of safety lamps as a grievance. If the U. M. W. A., after much searching, can find no greater injustice on the part of the N. S. Steel Company than the introduction of safety lamps in the place of open lights, it looks as if there was really not very much wrong at Sydney Mines.

The general introduction of safety lamps into Nova Scotia mines is a very pleasing sign of the times. There is now not a

single colliery of any importance in Nova Scotia in which the use of naked lights is allowed, and we hope before long to see safety lamps made compulsory in all coal mines in Nova Scotia, no matter what the conditions. It is further to be hoped that naked lights in coal mines will be prohibited throughout the entire Dominion. It is better to be sure than sorry.

## QUEBEC.

A plant to test the value of placer gold deposits in the body of the stream near Marbleton is reported about to be installed, and mining experts have been over the ground and further developments are expected.

The D'Israeli Asbestos Mining Company have broken ground and are about erecting a plant a short distance from D'Israeli station, including siding to their works.

Chrome mining at Lakeside, near Black Lake, shows a lull at the present time, and the outlook not as extensive as formerly, but is understood that improved mining operations will be established there soon.

The Robertson Asbestos Company, at Robertson Station, have built their mill, and are now installing plant. The Shawinigan Electric Power Co. will supply the power.

The Shawinigan Electric Power Co. have extended their power to East Broughton and established a distributing station there.

At East Broughton the new mill of the Frontenac Asbestos Co. is nearing completion, and the mines and mills are expected to be in full operation about the middle of the summer.

The Broughton Asbestos Fibre Co. are now working, and the Eastern Townships Co. and Boston Asbestos Co. will commence operations about the first of June.

The Quebec Asbestos Co. have sold their mills and plant to the Ling Asbestos Co. of New York. The property is being refitted with an electric plant, the pits have all been cleared out, and operations will be commenced in a few days.

Rich deposits of copper ore are reported to have been found on the Chaudiere Valley of the Quebec Central Railway. Mr. Pennington, M.L.A., is president of the company that is organized for the working of this property.

The Quebec Central Railway are now building 30 miles of New line from St. George, Beauce, following the River Famine to the watershed of the St. John River close to the boundary of the State of Maine. It will be remembered that considerable quantities of gold have been taken out of the Famine River in years past, and it may be that further operations in placer mining along the Famine Valley will be resumed owing to the greater facilities which will be found by this line.

Reports of asbestos deposits come from the Township of Panet, County of L'Islet. This will be on the proposed further extension of the Quebec Central Chaudiere Valley Line in the direction of the Temiscouata Railway.

## ONTARIO.

**Cobalt.**—One of the most interesting sections of this camp is in the locality of Peterson Lake, where a number of companies are operating claims leased from the Peterson Lake Mining Company. This company's holdings consist of 208 acres, located under Peterson Lake, and having a narrow strip of land, originally about 33 feet in width above high water mark. The subsequent lowering of the waters of the lake materially increased the land area. By the terms of the contract with the holding company, the leases are to run five years, and during that period the company receives 25 per cent. of the gross value of the ore mined. The leases are also conditional upon the proper develop-



ment of the different properties. This insures a systematic exploration for the valuable minerals. Among the most important of the operating companies are the Brydge Syndicate, the Cobalt Leases, the Little Nipissing, the Gould Consolidated and the Kerrey Mining Co. These companies are rapidly developing their holdings in order to get the greatest amount of ore possible before the expiration of the leases, and some of them have large plants in operation.

Negotiations have now been concluded whereby the Argentum Mines Company, Ltd., a flotation of the Nevins interests, which have control of the Cobalt Central, will assist in the development of the Foster, twenty-five thousand dollars having been pledged to carry on the development work on the latter property. Arrangements have also been made for the treatment of the low-grade ores and dump of the Foster in the mill of the Cobalt Central. A flat treatment rate per ton will be charged, and the resulting profits will be equally divided between the Argentum and Foster Companies. The arrangements also include a five-year lease on the Foster.

The Warner property, a 20-acre claim located north of the Kerr Lake, is to commence operations, and in a short time a force of men will start surface prospecting. The property is controlled by a Montreal syndicate, and will be known as the Imperial Crown Mines, Limited.

The Crown Reserve have completed the sinking of a 100-foot winze from the main vein at the 100-foot level, and are now drifting in both directions. This is now the deepest working of the mine, practically all the other workings being at a depth of 100 feet. At the lower level the vein shows good widths and values. The No. 1. cross-cut, in which six high-grade veins were located, has been driven to the other side of the lake, a distance of over 500 feet. The No. 2 cross-cut, which is being driven toward the eastern boundary, is in over 450 feet, and has already cut several veins. On one of these a winze has been sunk 25 feet, and will be continued 75 feet more, at which depth drifts and cross-cuts will be run. A new bunkhouse sufficiently large to accommodate 100 men is being erected. It is generally understood in the camp that a higher output will be maintained by the Crown Reserve in the future. A total force of 155 men is employed on the property.

Mr. H. D. Symmes, of the Hydraulic Power Company, has purchased four more machine drills for the work at Ragged Chutes. Operations will be pushed as rapidly as possible in order than the plant may soon be ready to supply power. The contract for hauling the pipe has been placed, and it is now being distributed over the line, and is being welded.

The directors of the Eastern Townships Mine, which was formerly known as the Old Chap, located near the head of Cross Lake, have decided to resume operations on the property. A small steam plant will be installed to do the preliminary development work. Mr. Brown, of the Silver Cross, has been appointed consulting engineer.

A new vein of high grade ore has recently been located on the Drummond property by the diamond drill. Several holes at different angles have been bored to prove the vein, and in every case high values were encountered. The vein is about six inches wide.

A large number of the mines have resorted to the use of the diamond drill for prospecting, and at the present time there are seventeen drills working in the camp. A total average of about six thousand feet a month is being bored.

A new strike has been made at the King Edward Mine, the ore body being encountered at the seventy-foot level about four hundred feet west of the shaft. The vein matter consists of galena, bornite, calcite and native silver.

The Coniagas have been carrying on work for some time in their smelter at Thorold, perfecting their system of ore treatment, and at last have their process in such a satisfactory

working condition that they will soon be in the market for the smelting of Cobalt ores in competition with the other smelters. At the mine everything is in good shape, the only drawback being that the mill is hardly of sufficient capacity to handle the ore that is taken from the various workings. The veins are narrow but rich and the values are scattered over a good width, so much so that in one place they are stoping thirty feet wide. Very little stoping is done, most of the ore coming from development work. Of the various workings of the mine, having a total length of over seven thousand feet, there is only one that is unproductive, and it is thought that if this working is driven a few feet further ore will be encountered. The ore reserves of the Coniagas are very large, being exceeded, perhaps, by only two other mines in the camp. The new two hundred and fifty horsepower gas producer, installed a short time ago, is giving satisfaction.

New discoveries of high grade veins are reported on the Bonsall and Big 6 claims in the Miller Lake district.

While trenching on the Farah property a new vein of cobalt and native silver was discovered. The vein is about one hundred feet from the No. 1 shaft, which is now down in the neighborhood of one hundred feet. A crosscut to tap the ore body at this level will be started almost immediately. About fifty men are employed at the present time and the work is being vigorously pushed.

The Council of the Township of Coleman have voted a large sum of money to be spent in improving the roads during the coming summer. The principal work will consist of grading and putting in shape the road through the Nipissing property on the east side of Cobalt Lake, and as far out as the Savage Mine. Considerable work will also be done on several others of the more travelled roads. It would meet with universal favor if the T. & N. O. Railway or the town of Cobalt would pay some attention to the road around the railway. This section is a disgrace, there being easily nine inches of mud, and the immense number of teams hauling freight and ore keep the spot in little better condition than a quagmire.

At the Cobalt Lake development is confined to the workings from the No. 6 shaft, where there are now only two drills at work. A winze is being sunk from the crosscut and when a depth of fifty feet is reached the crosscut will be continued from that level. It is hoped that one of the McKinley-Darragh veins that showed high silver values at the two hundred foot level will be encountered in the working.

The development of the Lawson property by the La Rose is being watched with great interest, and there is much speculation as to whether or not the famous "silver sidewalk" will show corresponding values at depth. The property is being developed from the old shaft sunk by the Silver Leaf and a drift is being run on the vein at the one hundred and ten foot level. Running at right angles to the famous vein and to the south of the roadway a new vein equally rich was discovered while trenching. The new find was traced for some distance and promises to become a good producer.

The Little Nipissing have struck high-grade ore in their main vein on the Peterson Lake Lease, at the one hundred and sixty foot level. Previous to this considerable drafting had been done but the ore encountered was of low grade.

Another deal for properties in South Lorraine has been put through whereby a Haileybury syndicate has purchased four forty-acre lots known as the Finnessey claims. A force of men will be started to work in the course of a few weeks.

A contract has been let by the Cochrane mine to sink the shaft another 75 feet from the 135-foot level. At a depth of 145 feet in the shaft the diabase rock underlying the Keewatin was located.

The development of the veins in the Huronian slates underlying the diabase in the Big Pete mine of the Cobalt Central



gives the most promising showings so far found on the property.

Mr. R. Taylor, formerly of the Kerr Lake, has been appointed manager of the Right of Way, in place of Mr. J. Houston, who has resigned to take charge of the Bonsall claim, owned by O'Brien and Sifton. Mr. Houston will be retained by the Right of Way in an advisory capacity.

The appointment of Mr. Chas. Watson as superintendent of the Chambers-Ferland has been made permanent. Mr. Watson was formerly with the Nipissing, and his duties at that mine will be taken over by Mr. H. McKee.

According to present indications, the river navigation between Elk Lake and Latchford will be open about May 17th. The Upper Ontario Steamboat Company will operate seven passenger boats and also a number of scows to handle the freight. The first trip of the season was made on the 10th, when a boat went as far as Pork Rapids. Later the route was extended to Mountain Chutes. On each trip the boats were crowded with prospectors and their canoes. When the regular service is installed two return trips daily will be made between the two towns.

The shaft on the property of the White Syndicate, formerly known as the Canadian Ores, Limited, is down 145 feet, and from the bottom a drift has been started on a calcite vein carrying silver values. On this vein this drift will be driven a distance of 200 feet, when it is expected that the main vein of the property will be encountered. Four hundred sacks of ore have been taken from an open cut on this vein. A force of 35 men is at work on the property.

The Right of Way has declared a 10 per cent. bonus, to be paid on the 20th of May. Up to the present for this year the mine has produced 700,000 ounces of silver, and from present indications the company will be able to continue their disbursements to the stockholders at the rate of 5 per cent. per month.

On May 5th the first shipment of gold ore from Munroe Township was made by the Guelph Mining Syndicate. The shipment consists of four tons, and was sent to the Kingston School of Mines for a sample run. Recent developments in this district have added greatly to its possibilities of becoming a gold producer. The veins as a whole are small, but carry high values.

Work is under way on the erection of a new concentrating mill at the Colonial Mine.

Mr. John Harris has severed his connection with the Victoria mine.

Following the great rush of the past winter, the mines of Gowanda are settling down to serious work. The most essential need at the present time is a railroad, and until this is built the camp cannot make very great headway. So far the deepest working is on the Boyd Gordon, whose shaft is down fifty feet. One hundred bags of high-grade ore have been taken from the working. Two shafts are being sunk on the Mann claim, one being down about 25 feet, and the other 15 feet. The Bartlett has some of the most promising showings in the new district, but so far their energies have been directed towards the installation of the machinery, which they expect to have in running order about June 15th.

An important strike was made on the 200-foot level of the Beaver Mine on May 15th. A cross-cut was run from the main shaft for a distance of 50 feet, when a large quartz and calcite vein, with no silver, was encountered. The vein was drifted on, with the result that high silver values were found. The quartz in the vein has been replaced by calcite, and there is no small-tite. The vein is said to be nearly ten inches wide. At a distance of 234 feet east of the shaft a diamond drill is working on the 200-foot level. A hole at an angle of 45 degrees is being bored, and it is expected that when in a distance of about 125 feet another vein showing on the surface will be encountered.

## BRITISH COLUMBIA.

**Rossland.**—In Le Roi Mining Company affairs there is nothing definite to be said yet, but it is generally understood that Mr. A. J. McMillan, the managing director, is meeting with some considerable success in London in the arrangement of finances with which to carry out the proposed big plan of development of the company's property. It will certainly be gratifying to see the Le Roi mine undergoing a plan of thorough development from the 1,650-foot level downward, and it is to be hoped that the beginning of the work will not be deferred. There is no good reason why the smelter at Northport cannot be run at a profit, and this plant will undoubtedly be a paying enterprise under the proposed new order of things. The prime requisite, of course, is a supply of ore (self-fluxing, preferably) that will permit of operation at full capacity. Part of the plan now being worked on, along lines followed by most English companies, will be in the direction of acquiring new mines than may be developed to a profit earning point by the time the older mines are worked out. The near future will very likely witness important developments in Le Roi matters.

It is pleasing to note that the ore shipments from this camp are averaging from 4,500 to 5,000 tons per week, even though the Le Roi, which has had to give place to the Centre Star group as "premier mine of the camp," is closed down. The property of the Consolidated Company is shipping over 4,000 tons per week: the Le Roi 2, Ltd., nearly 500 tons, while during the week ending May 8, 1909, the O. K. lessees shipped 10 tons, and the I. X. L. 4 tons of high-grade gold ore. It is expected shipments will be resumed from the Blue Bird in a few weeks. One the Blue Bird a drift, from 35 feet depth in the shaft, has been driven 40 feet west and 20 feet east in galena, the ledge appearing from one to two feet wide and assaying about \$100 pr ton. On the Hattie Brown claim, adjoining, the shaft is being rapidly sunk on the main ledge, assays at this time, giving above \$20 per ton in silver, gold and lead. The Richmond claim, which is also on this galena vein is being worked by a small force. The Hattie Brown and Richmond have been bonded by New York capitalists, who are prepared to spend a goodly sum on proper development.

The partial success that South Belt mines have enjoyed recently would seem to assist in bearing out the statement of Clarence King and other prominent mining engineers, that the largest and richest mineral deposits in Rossland have not been uncovered yet, and would possibly be found in the valley of Trail Creek or in that section of the camp known as the "South Belt."

The rich ore shoot on the 900-foot level of the War Eagle has now been opened up on the 1,000-foot level, and shows up 400 feet long, and averaging 50 feet in width. Several thousand tons of ore that carried an average of \$30 in gold have already been taken from this lode, and it is estimated there is a million dollars' worth of ore yet in the stoping area.

Granby interests have not lost hope in this locality, despite the apparently poor results obtained at the Giant-California, and the Mascot claim has now been secured, and development work will immediately be commenced. If results of initial work warrant, as much as \$350,000 is available for development.

The Granby people are not making much fuss about what they are doing in an expansive way, but when one realizes they have interested themselves in promising mines in the Similkameen, Moresby Ilands, Rossland, Washington, etc., and that these mines are mostly big groups of rich copper claims, then it looks as though some of the men "in touch" thought there was a future for the red metal.

**Phoenix District.**—The continued strike of coal mines in Coleman and other points in Alberta has been the cause of a shutdown of the British Columbia Copper Company's mines and



smelter. Several hundred men are thus thrown out of employment, only a few miners being kept at work on special development. Shutdowns of this kind are expensive affairs for big mining and smelting companies. This one will probably cost the B. C. Copper Co. between \$9,000 and \$10,000 per month, to cover fixed charges, maintenance, superintendence, etc. This same rule applies to the Dominion Copper Co., Le Roi Mining Co. and other presently inoperative mines, to a more or less degree.

The development work that the B. C. Copper Co. is doing on the Athelstan Fraction and Bay mineral claims is returning very satisfactory results. A fine body of ore is ready for stopping in No. 2 tunnel, and there is a big tonnage of shipping ore in dump that will be sent out as soon as the railway spur is built in.

The Snowshoe is shipping from 2,00 to 2,500 tons per week to the Consolidated smelter at Trail. The strike situation will not affect the Consolidated M. & S. Co. of Canada, as they have several months' coke supply in storage, and get most of their fuel at Fernie, where there is no trouble. This same applies to the Granby Consolidated Company.

Dominion Copper affairs will very likely be precipitated when the property of the company is put up for sale at Vancouver on May 28. Both the Reorganization and Protective Committees claim to have the strongest backing, the former maintaining that \$518,000 out of the \$800,000 outstanding bonds have been deposited with them.

Winnipeg capitalists have made the first payment under the bond they have on the Bruce mine, near Midway. Development

is going ahead with good results, and present indications show the proximity of a big body of gold-copper ore.

Apropos of a change of policy on the part of the Daly Reduction Co., the Nickel Plate and Sunnyside properties have been undergoing a thorough sampling, the breaking of ore a times requiring a force of eighteen or twenty men. Two diamond drills are also at work. Walter Bean, of Denver, and G. P. Merrill are superintending the work in the interests of their principals.

The shaft at the Golden Zone is going down about 12 feet per week. It is now down 95 feet, and some of the best ore ever found on the property has been taken out at this depth.

**Vancouver.**—The Japanese operators of the Ikeda mine, on Moresby Island, have made a strike of 25 feet of copper ore in one of the deep tunnels. Recent assays show the ore to carry 13 oz. copper, silver 7 oz., gold \$8.50. The Japanese are, in this instance, proving themselves mining men of no mean ability but one can expect this from men who work low-grade copper deposits in their native land by methods now considered crude and they make even these mines pay.

As hinted at above, Granby interests have bonded the Contact group on Tasso Harbour, Moresby Island. The property is to be developed as rapidly as possible.

Mining men from Duluth, Minn., have bonded a rich group of copper claims at Tasso Harbour, paying \$400,000 for the property. T. Taylor and F. C. Elliott, of Revelstoke, were the seller. The purchasers, it is said, are men in close touch with the Steel Corporation. Development of the property will commence this season.

## GENERAL MINING NEWS.

### ONTARIO.

**Cobalt.**—On the T. & H. B. there are sixty men and six drills working. One of the drills is being operated in Trethewey territory on the third level. One drill is now operating on the first level, but the main activity is on the second level on the Lavel and Rice veins. The Rice drift has an ore shoot of 135 feet, and work is still proceeding on it. The ore shoot on the Lavel is about 165 feet long on the third level. There is at present about 7,000 tons of concentrating ore on the dump.

Drifting has been started from the 200-foot level of the main Crown Reserve vein. The drift is being driven east from the bottom of the old open-cut shaft, and the vein at this depth runs from six to eight inches of ore.

On the Nipissing the drifts on both the Kendall vein and vein 82 have reached the McKinley line. The second level of the Kendall is at a depth of 145 feet, and drifting has been done for 350 feet. The Fourth of July shaft is now down 200 feet, and stations are being cut on it. Shaft 64 has been sunk 200 feet with drifts at the 80 and 175 foot levels.

A new strike was recently made while drifting on the No. 4 vein of the King Edward mine. The new ore body is about four inches wide, containing native silver, with galena and bornite.

On the McDonald vein of the Kerr Lake a winze has been sunk 32 feet from the 150-foot level. The pay chute on No. 7 has been traced a distance of 600 feet, and the ore averages 3,000 ounces to the ton.

The La Rose has begun developments on the Lawson. The old Silver Leaf shaft is down less than 100 feet, and driving has been already started at the 90-foot level on a stringer that

is expected to lead to the main Lawson vein. At the La Rose mine raises are being made on the main vein. Good ore is steadily being taken out of No. 2 and 3 raises.

The Pontiac have struck the vein of their 75-foot level which they found with such high values on the surface. It is about two feet wide at the point exposed in the drift, although it does not run high in silver values, it looks very promising. The shaft of the Pontiac mine is down 75 feet.

A comparison of the Cobalt shipments by months for the first four months of each of the three years, 1906-7-8, with those of 1909, shows that the output is steadily increasing in a substantial way.

1906—January, 406.52 tons; February, 119.14 tons; March, 378.30; April, 137.20. Total—1,041.16 tons.

1907—January, 989.13 tons; February, 900.83 tons; March, 1,027.59 tons; April, 583.78 tons. Total, 3,501.33 tons.

1908—January, 1,481.27 tons; February, 1,184.53 tons; March, 1,815.27; April, 1,312.00. Total, 5,792.97 tons.

1909—January, 2,375.13 tons; February, 2,103.85; March, 2,561.78; April, 2,495.78. Total, 9,536.35 tons.

About 240 feet of drifting has been done on the 100-foot level and about 120 feet on the 200-foot level of the Badger mine. At the bottom of the shaft the vein shows about four inches wide of calcite and silver, from which some high assays have been taken.

At the 160-foot level of the main vein of the Little Nipissing mine, on the Peterson Lake lease, a 2-inch vein, which has been running fairly lean for some distance, has now come up with high values in native silver.



The new vein of the Lawson mine of the La Rose Consolidated has been stripped for 28 feet. The vein is six inches wide, and shows considerable native silver.

A rich strike was made at the Beaver mine on May 14th. The strike was made at the 200-foot level of the main shaft, 50 feet on the east drift. The vein is from 10 to 12 inches wide, and carries considerable silver values.

The Argentum Mines, Limited, have taken over the Foster mine under a five-year operating contract. The new company has perfected an arrangement with the Cobalt Central Company whereby the Foster ores will be handled at the Cobalt Central mill.

**Elk Lake.**—The Otisse orehouse is now about filled with ore, and as soon as navigation opens a shipment will be made so as to give room for the ore now being sacked. The ore now coming up from both shafts is being sorted and sacked, and the quantity is accumulating rapidly.

The Moose Horn was closed down for about ten days on account of the sinking of the foundation of one of the boilers, and the consequent breaking of one of the flanges. The damage has been repaired, and the mine is again running. The shaft is now down 125 feet, at which depth an aplite vein six inches wide has been opened up.

The Otisse Currie intends to start sinking another shaft on the northeast corner of their property. The present shaft is to be continued to the 250-foot level, with cross-cuts at the 150 and 250-foot levels.

A corduroy road is being laid from Elk Lake to Gowganda, so there will be no necessity for prospectors to follow the long canoe route if they wish to make a quick and light trip.

#### ALBERTA.

**Coleman.**—The striking coal miners have applied for a Board of Arbitration under the Lemieux Act. This step is rather unexpected, as Sherman, the leader of the strikers, has personally condemned the Lemieux Act. The action of the miners is said to be largely due to the attitude of the International officers.

Frank Sherman has been named as the representative of the men on the board.

#### BRITISH COLUMBIA.

**Rossland.**—There already has been between 2,000 and 3,000 tons of ore extracted from the big ore shoot on the ninth level of the War Eagle. It is about 400 feet long and 50 feet wide, and the ore runs from \$20 to \$30 per ton. A downward continuation of this ore shoot has been located on the tenth level, but its dimensions have not yet been determined.

Development of the Blue Bird continues to show up considerable ore. Drifts have been run from the shaft at a depth of 35 feet both east and west. The west drift is 40 feet in length, and the east is 20 feet. Both are in galena ore from a foot to two feet in width. Another ledge, 50 feet away from the main lead, has been stripped and opened by shallow shafts. It is from two to four feet wide, and carries galena ore of a good grade.

**Greenwood.**—The Board of Conciliation and Arbitration to inquire into the differences between the B. C. Copper Co. and its employees is meeting daily. Judge Wilson, of Cranbrook, is chairman of the board. E. G. Warren is representing the company, and Geo. Heatherton the union. The investigation will probably last a couple of weeks.

**Phoenix.**—It is the intention of the Granby Company to resume shipments from the Gold Drop about the middle of May.

The work of enlarging Nos. 3 and 4 furnaces at the Granby is being rushed, and they are expected to be completed about the middle of May. This will bring the smelting capacity up to 400 tons daily.

**Vancouver.**—The properties of the Dominion Copper Company, in liquidation, will be disposed of by public auction in Vancouver on the 28th of May, subject to reserve bids fixed by the judge in chambers, in two lots. Lot "A" will consist of all the company's property, real and personal, except that included in lot "B." Lot "B" will consist chiefly of supplies on hand for the mines and smelter and the benefit of a contract with the C. P. R. respecting freight rates.

## MINING NEWS OF THE WORLD.

#### GREAT BRITAIN.

Trouble is brewing in the Scotch coal trade. The masters demand that miners' wages be reduced to 5s. 6d. per day, whilst the men hold that the minimum must not go below 6s., and as the agreement hitherto existing between the masters and men has expired, a settlement may not be secured without a strike.

The coming into effect on July 1st next of the Mines Eight Hours Act will terminate the present agreement in South Wales, which under ordinary circumstances would continue until March 31st, 1910. So far, all efforts to reach a new agreement have failed, and trouble is expected.

The production of pig iron in the United Kingdom last year was the smallest in sixteen years. The output last year amounted to 9,289,840 tons, as compared with 9,923,856 tons in 1907, and 10,149,388 tons in 1906. The decrease of 134,016 tons as shown is the greatest recorded in any one year since 1892.

#### BELGIUM.

The Cockerill Company, who own extensive steel works in Seneffe, Belgium, are installing an electric furnace. The furnace

is built on the Girod system, with one electrode, and has a charging capacity of from two to three tons of steel.

#### RUSSIA.

The Mining Department is undertaking the revision of the general statutes of the gold industry. The present law, which has been in operation since 1903, is so obscure in parts that it has given rise to many misunderstandings in practice.

A special council has been opened in the Mining Department to consider the proposals to regulate the platinum industry in Russia.

#### AUSTRALASIA.

The Federal High Court has sustained the principal factors of the Federal Arbitration award in the Broken Hill Proprietary Company's appeal relative to the dispute with the employees at Port Pirie and Broken Hill, but has found against the award on the question of granting a 48-hour week at Port Pirie. The company will resume concentrating and smelting

ore at Broken Hill and Port Pirie until the completion of existing contracts.

All the leading mining companies in the silver-lead district of Western Tasmania, according to Consul Henry D. Baker, showed a diminution in their earnings during 1908, with the exception of several companies engaged in mining coal; this was the only mineral product whose value showed an increase over that of 1907.

#### SOUTH AFRICA.

Work in some of the outlying districts of the Transvaal has been much retarded this year on account of severe outbreaks of malarial fever, due, no doubt, in a large measure to the exceptionally heavy rains that have fallen, resulting in the creation of a large amount of decaying vegetable matter and other conditions generally associated with malaria.

Rand milling profits fell below 30 shillings per ton in March, or nearly nine shillings below the average for 1904, since which time there has been an almost continuous decrease.

A syndicate has been formed to work large iron ore deposits in the neighborhood of Alberstone, about thirty miles from Durban, Natal. The deposits consist of brown and purple hematites and limonite. An ample supply of limestone is said to be available.

#### UNITED STATES.

The legislature of Washington has appropriated \$50,000 for the State Geological Survey for the biennial period, 1909-10. Of

this amount \$30,000 will be used for co-operative mapping and hydrographic investigations, and \$20,000 for geologic investigations.

The miners of the Pennsylvania anthracite region have finally decided to renew the old agreement with the operators for another three years.

After a year or more of experimenting, those in charge of the electric iron ore smelter at Heroult, Cal., consider that they have made a commercial success of the project. The large new furnace was tapped for the first time last week. It is expected that the furnace will turn out about 200 tons of commercial pig iron daily.

The United States Senate has adopted the recommendation of the Committee on Finance for a duty of 25 cents per ton on iron ore. The House had placed that article on the free list, while the present law levies a duty on it of 40 cents per ton.

#### MEXICO.

The projected new mining law will probably not be introduced at the present session of the Mexican Congress. Inasmuch as the law is intended to be a codification of all existing laws and decrees, it is exceedingly broad in its scope, and touches on many points that are naturally open for discussion. It is said that the delay in enacting the law is due to the necessity of much consideration of these new points and phases.

## COMPANY NOTES.

#### APRIL STATEMENT OF LA ROSE.

The preliminary statement of production and earnings of the La Rose Mines, Limited, for the month of April, 1909, follows:—

|                                                                   |       | Silver<br>Contents. | Net<br>Value. |
|-------------------------------------------------------------------|-------|---------------------|---------------|
| April production—                                                 | Tons. |                     |               |
| Shipments . . . . .                                               | 625   | 315,544             | \$133,652     |
| On hand, April 30.....                                            | 285   | 267,913             | 123,139       |
|                                                                   | 910   | 583,457             | \$256,791     |
| Less on hand, March 31.....                                       | 237   | 313,090             | 145,882       |
| April production . . . . .                                        | 673   | 270,367             | \$110,909     |
| Estimated expense . . . . .                                       |       |                     | 26,794        |
| Net profit for April . . . . .                                    |       |                     | 84,115        |
|                                                                   |       | Silver<br>Contents. | Net<br>Value. |
| Total for 11 months, June 1, 1908, to<br>April 30, 1909 . . . . . |       | 2,732,295           | \$959,584     |

#### NORTHERN EXPLORATION CO. PAYS 280 PER CENT.

The Northern Exploration Co. of Cobalt, with a paid-up capital of \$100,000, has recently declared a dividend of 140 per cent., payable in La Rose shares, taken at a market value of \$7 per share. The company has already paid several cash dividends of 10 per cent. each.

The Northern Exploration Company's shares were originally sold at 50 cents, so that the dividend is really equal to 280 per cent. on the cash invested.

#### KERR LAKE DECLARES DIVIDEND.

The Board of Directors of the Kerr Lake Mining Company have declared the regular quarterly dividend of 4 per cent., and an extra dividend of 2 per cent. upon the capital stock of the company payable June 15th, 1909, to all stockholders of record June 1st, 1909.

#### NIPISSING'S APRIL STATEMENT.

During the month of April the Nipissing mined ore of estimated net value of \$149,789, and shipped ore of an estimated net value of \$96,492. This compares with ore mined in March to the value of \$141,623, and ore shipped to the value of \$193,845. Of the total 291,620 ounces of silver produced during April 108,689 ounces, or 37 per cent., came from the Kenda vein.

#### PETERSON LAKE CO. ANNUAL REPORT.

The third annual report of the Peterson Lake Silver-Cobalt Mining Company, Limited, has been mailed to shareholders.

At no expense to the Peterson Lake Company, a great deal of thorough work has been performed by the different lessees in the direction of proving up a large claim area.



Much of this work would probably not have been attempted by the parent company if conducting development and prospecting operations entirely on its own account.

Only two of the lessees have up to the present time produced any ore. The Nova Scotia and the Little Nipissing have been the producers, and from them the Peterson Lake Company draws a royalty of 25 per cent. in the form of net profit.

The double compartment shaft of the Nova Scotia has been sunk 240 feet. This shaft is located in Nova Scotia ground, so that, in order to tap the ore bodies now being explored on the Peterson property, the parent company would be under the necessity of sinking a shaft for itself.

The report makes no promise of dividends to stockholders as yet.

## STATISTICS AND RETURNS.

### DOMINION COAL OUTPUT.

|                    | 1908.        | 1908.            |
|--------------------|--------------|------------------|
| January . . . . .  | 314,108 tons | 200,176 tons     |
| February . . . . . | 285,649 "    | 209,656 "        |
| March . . . . .    | 346,529 "    | 253,622 "        |
| April . . . . .    | 335,829 "    | 294,017 "        |
| May . . . . .      | 335,829 "    | 300,000 " (est.) |
|                    | 1,585,364 "  | 1,257,471 "      |

Decrease, 327,893 tons.

### COBALT ORE SHIPMENTS.

Following are the weekly shipments from the Cobalt camp, and those from Jan. 1, 1909, to date:—

|                         | Week ending<br>May 8. | Since<br>Jan. 1. |
|-------------------------|-----------------------|------------------|
|                         | Ore in lbs.           | Ore in lbs.      |
| Coniagas . . . . .      | 65,400                | 590,220          |
| Crown Reserve . . . . . | 102,816               | 1,883,935        |
| Kerr Lake . . . . .     | 122,201               | 605,643          |
| La Rose . . . . .       | 327,500               | 5,018,518        |
| Nipissing . . . . .     | 337,090               | 4,238,328        |
| Temiskaming . . . . .   | 150,060               | 993,260          |
| T. & H. B. . . . .      | 60,000                | 670,600          |

Ore shipments to May 8, 1909, from Jan. 1, are 20,121,033 pounds, or 10,060 tons. Total shipments for week ending May 8 are 1,164,867 pounds, or 582 tons.

|                                | Week ending<br>May 15. | Since<br>Jan. 1. |
|--------------------------------|------------------------|------------------|
| Buffalo . . . . .              | 42,990                 | 427,630          |
| Coniagas . . . . .             | .....                  | 590,220          |
| Crown Reserve . . . . .        | 108,100                | 1,992,035        |
| Cobalt Central . . . . .       | .....                  | 248,515          |
| Chambers-Ferland . . . . .     | .....                  | 520,440          |
| City of Cobalt . . . . .       | 59,000                 | 747,522          |
| Kerr Lake . . . . .            | .....                  | 605,643          |
| King Edward . . . . .          | .....                  | 98,030           |
| La Rose . . . . .              | 131,200                | 5,149,718        |
| McKinley-Darragh . . . . .     | 65,370                 | 589,650          |
| Nipissing . . . . .            | 62,060                 | 4,351,388        |
| Nova Scotia . . . . .          | .....                  | 480,810          |
| Nancy Helen . . . . .          | .....                  | 40,000           |
| Peterson Lake . . . . .        | .....                  | 132,960          |
| O'Brien . . . . .              | 63,850                 | 781,786          |
| Right of Way . . . . .         | .....                  | 1,205,672        |
| Silver Queen . . . . .         | .....                  | 127,865          |
| Temiskaming . . . . .          | 60,000                 | 1,053,260        |
| Trethewey . . . . .            | .....                  | 845,538          |
| T. & H. B. . . . .             | 64,200                 | 734,800          |
| Muggley Consolidated . . . . . | .....                  | 72,900           |

Ore shipments to May 15, 1909, from Jan. 1 are 20,777,803 pounds, or 10,288 tons. Total shipments for week ending May 15 are 656,770 pounds, or 328 tons.

### B. C. ORE SHIPMENTS.

The following are the ore shipments for the week ending April 30th and year to date:—

| Boundary—             | Week.  | Year.   |
|-----------------------|--------|---------|
| Mother Lode . . . . . | 7,140  | 139,022 |
| Granby . . . . .      | 22,542 | 313,013 |
| Snowshoe . . . . .    | 3,119  | 37,661  |
| Other mines . . . . . | .....  | 1,793   |

Total . . . . . 32,801 491,489

| Rossland—                 | Week. | Year.  |
|---------------------------|-------|--------|
| Centre Star . . . . .     | 3,591 | 51,182 |
| Le Roi No. 2 . . . . .    | 654   | 10,511 |
| Le Roi (milled) . . . . . | 260   | 9,260  |
| Other mines . . . . .     | ..... | 9,393  |

Total . . . . . 4,505 80,346

| Slocan-Kootenay—                   | Week. | Year.  |
|------------------------------------|-------|--------|
| Whitewater Deep (milled) . . . . . | 700   | 11,700 |
| Bluebell (milled) . . . . .        | 900   | 14,900 |
| Granite Poorman (milled) . . . . . | 250   | 4,100  |
| Queen (milled) . . . . .           | 420   | 6,930  |
| Second Relief (milled) . . . . .   | 145   | 2,495  |
| Nugget (milled) . . . . .          | 110   | 1,820  |
| Silver King . . . . .              | 487   | 1,465  |
| St. Eugene . . . . .               | 207   | 7,015  |
| Ruth . . . . .                     | 123   | 420    |
| Whitewater Deep . . . . .          | 110   | 757    |
| Lucky Jim . . . . .                | 214   | 214    |
| Kootenay Belle (milled) . . . . .  | 70    | 1,160  |
| Yankee Girl . . . . .              | 67    | 161    |
| Standard . . . . .                 | 33    | 321    |
| Silver Cup . . . . .               | 70    | 376    |
| Other mines . . . . .              | ..... | 6,987  |

Total . . . . . 3,906 60,815

Grand total . . . . . 41,212 632,650

### SMELTER RECEIPTS.

|                     |        |         |
|---------------------|--------|---------|
| Granby . . . . .    | 22,542 | 313,223 |
| Greenwood . . . . . | 7,140  | 140,505 |
| Trail . . . . .     | 8,351  | 117,502 |
| Total . . . . .     | 38,033 | 583,991 |

**B. C. ORE SHIPMENTS.**

The following are the ore shipments and smelter receipts for the week ending May 7th and year to date:—

| Boundary—             | Week.  | Year.   |
|-----------------------|--------|---------|
| Granby . . . . .      | 19,548 | 332,561 |
| Snowshoe . . . . .    | 1,548  | 30,209  |
| Sally . . . . .       | 16     | 77      |
| Other mines . . . . . |        | 22,754  |
| Total . . . . .       | 21,112 | 394,501 |

| Rossland—                       | Week. | Year.  |
|---------------------------------|-------|--------|
| Centre Star . . . . .           | 4,290 | 55,472 |
| Le Roi No. 2 . . . . .          | 631   | 11,142 |
| Le Roi No. 2 (milled) . . . . . | 260   | 9,260  |
| Le Roi . . . . .                | 40    | 60     |
| Other mines . . . . .           |       | 9,393  |
| Total . . . . .                 | 5,221 | 85,327 |

| Slocan-Kootenay—                   | Week.  | Year.   |
|------------------------------------|--------|---------|
| Bluebell (milled) . . . . .        | 900    | 15,800  |
| Whitewater Deep (milled) . . . . . | 700    | 12,400  |
| Granite Poorman (milled) . . . . . | 250    | 4,350   |
| Queen (milled) . . . . .           | 420    | 7,350   |
| Second Relief (milled) . . . . .   | 145    | 2,640   |
| Nugget (milled) . . . . .          | 110    | 1,930   |
| St. Eugene . . . . .               | 556    | 7,571   |
| Richmond - Eureka . . . . .        | 119    | 1,341   |
| Luck Jim . . . . .                 | 120    | 334     |
| Whitewater Deep . . . . .          | 135    | 886     |
| Silver Cup . . . . .               | 170    | 545     |
| Kootenay Belle (milled) . . . . .  | 70     | 1,160   |
| Yankee Girl . . . . .              | 65     | 226     |
| Bluebell . . . . .                 | 79     | 1,886   |
| Other mines . . . . .              | ..     | 6,235   |
| Total . . . . .                    | 3,839  | 64,654  |
| Grand total . . . . .              | 30,172 | 544,822 |

**SMELTER RECEIPTS.**

|                       | Week.  | Year.   |
|-----------------------|--------|---------|
| Grand Forks . . . . . | 19,548 | 332,771 |
| Trail . . . . .       | 7,514  | 125,016 |
| Total . . . . .       | 27,062 | 457,787 |

**RAND GOLD OUTPUT.**

The April output of gold at the Rand is officially placed at 607,101 fine ounces, valued at £2,578,804. The preliminary figures, issued on May 1 last, placed the outturn at 600,000 fine ounces.

The following table gives the output of gold at the Rand (in fine ounces) for a series of years:—

|                    | 1909.   | 1908.   | 1907.   | 1906.   |
|--------------------|---------|---------|---------|---------|
| January . . . . .  | 615,113 | 560,329 | 537,638 | 428,638 |
| February . . . . . | 565,218 | 541,930 | 493,542 | 407,668 |
| March . . . . .    | 607,500 | 574,901 | 538,497 | 443,723 |
| April . . . . .    | 607,101 | 565,832 | 537,019 | 439,243 |

**SILVER PRICES.**

|     |              | New York.<br>cents. | London.<br>pence. |
|-----|--------------|---------------------|-------------------|
| May | 5 . . . . .  | 53 7/8              | 24 7/8            |
| "   | 6 . . . . .  | 53 1/2              | 24 5/8            |
| "   | 7 . . . . .  | 53 1/2              | 24 5/8            |
| "   | 8 . . . . .  | 53 1/8              | 24 7-16           |
| "   | 10 . . . . . | 53                  | 24 3/8            |
| "   | 11 . . . . . | 53 1/8              | 24 7-16           |
| "   | 12 . . . . . | 52 1/2              | 24 3-16           |
| "   | 13 . . . . . | 52 3/4              | 24 1/4            |
| "   | 14 . . . . . | 52 7/8              | 24 5-16           |
| "   | 15 . . . . . | 52 3/8              | 24 1/8            |
| "   | 17 . . . . . | 53                  | 24 3/8            |
| "   | 18 . . . . . | 52 5/8              | 24 3-16           |
| "   | 19 . . . . . | 52 5/8              | 24 3-16           |

**MARKET REPORTS.**

May 18th.—Connellsville coke, f.o.b., ovens:—

Furnace coke, prompt, \$1.40 to \$1.50.

Foundry coke, prompt, \$1.75 to \$1.90.

**Metals.**

May 18th.—Tin, Straits, 28.87 1/2 cents.

Copper, prime Lake, 13.25 to 13.37 1/2 cents.

Electrolytic copper, 13 cents.

Copper wire, 14.50 cents.

Lead, 4.30 to 4.40 cents.

Spelter, 5.10 cents.

Sheet zinc, 7.25 cents.

Antimony, Cookson's, 8.25 cents.

Aluminium, 22 to 24 cents.

Nickel, 40 to 47 cents.

Platinum, \$22.50 to \$23.50 per ounce.

Bismuth, \$1.75 per lb.

Quicksilver, \$44.50 to \$45.00 per 75 lb. flask.

**Tin.**—Reports for May 28th show wholesale price for tin at 29 cents.

**Copper.**—Buyers are being warned against the effect of speculation in copper. A circular distributed in London and New York points to the conclusion that copper is too high at £60, and that it is not now worth more than £48 at most. Stocks on hand amounted to about 30,000 tons at this time last year. They now amount to not less than 400,000 tons and are growing. Last year's price at this time was £57. It is now £60.



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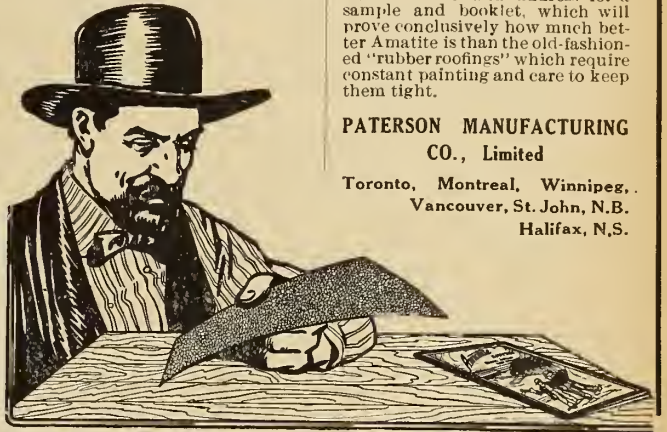
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#### **ONTARIO**

1076. Gowganda Mining Division.  
This map besides representing the geology of the Gowganda area, represents the geography of a considerable area to the east and north.

#### **BRITISH COLUMBIA**

1002. Geological Sheet, Special Map of Rossland.  
This map, on a scale of 400 feet to 1 inch, besides accurately indicating the topographical and cultural features, shews the geology and location of veins.  
1074. Sketch map of Sheep Creek Mining Camp, West Kootenay, B.C., scale 1 mile to 1 inch, by W. H. Boyd.  
NOTE.—Maps recently published may be had on linen cloth for use in the field at the price of 10c. per copy.

#### **REPORTS**

1072. Summary Report of the Operations of the Geological Survey for year 1908.

The Geological Survey, under certain limitations, will give information and advice upon subjects relating to general and economic geology. Mineral specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

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The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

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The Government grants **PROSPECTING LICENSES** for lands on which the mines belong to it, giving the holders of such license the first right to purchase the mines. In the case of lands where the surface only is sold, the owner of the surface may be expropriated if he refuses an amicable settlement.

The price of prospecting licenses is \$5.00 per hundred acres on surveyed lands and per square mile on unsurveyed lands. If the surface has already been sold, the price is only \$2.00. They are valid for three months and are renewable at the discretion of the Minister.

When mines are discovered, they can be bought or leased from the Government. The purchase price is as follows:—

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lands; work must be bona fide begun within two years and \$500.00 spent on each 100 acre concession.

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The description or designation must, however, be made to the satisfaction of the Minister.

Persons working mines must send in yearly reports of their operations to the Government.

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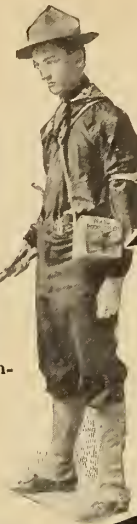
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The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year, or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey made, and upon complying with other requirements, purchase the land at \$1 per acre.

The patent provides for the payment of a royalty of 2½ per cent. on the sales.

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An applicant may obtain two leases to dredge for gold of five miles each for a term of twenty years, renewable at the discretion of the Minister of the Interior.

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles. Rental \$10 per annum for each mile of river leased. Royalty at the rate of 2½ per cent. collected on the output after it exceeds \$10,000.

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SEE INDEX TO ADVERTISERS PAGE XXVIII.

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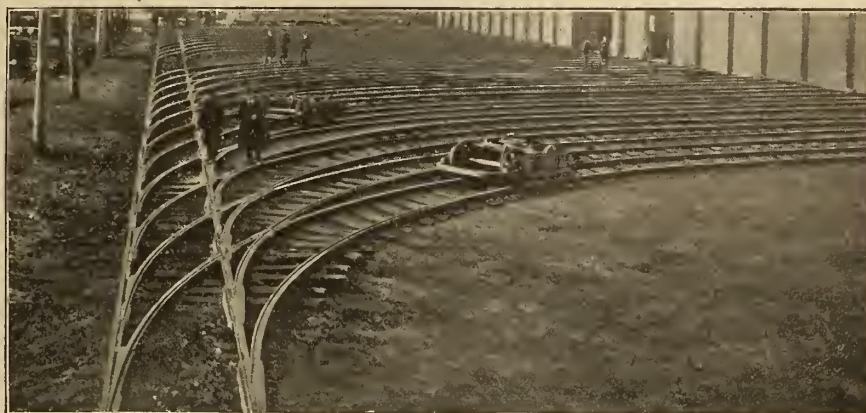
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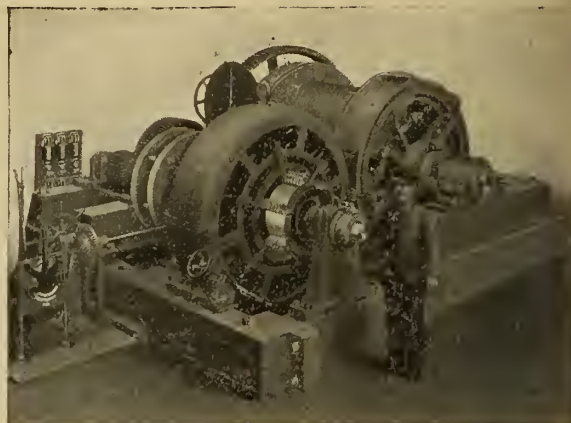
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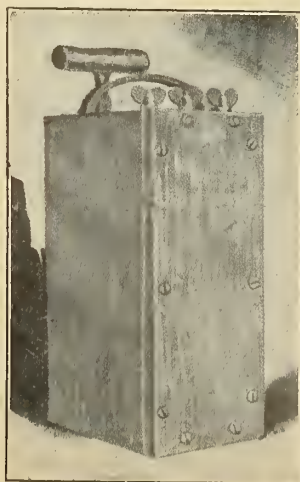
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BULLETIN 40

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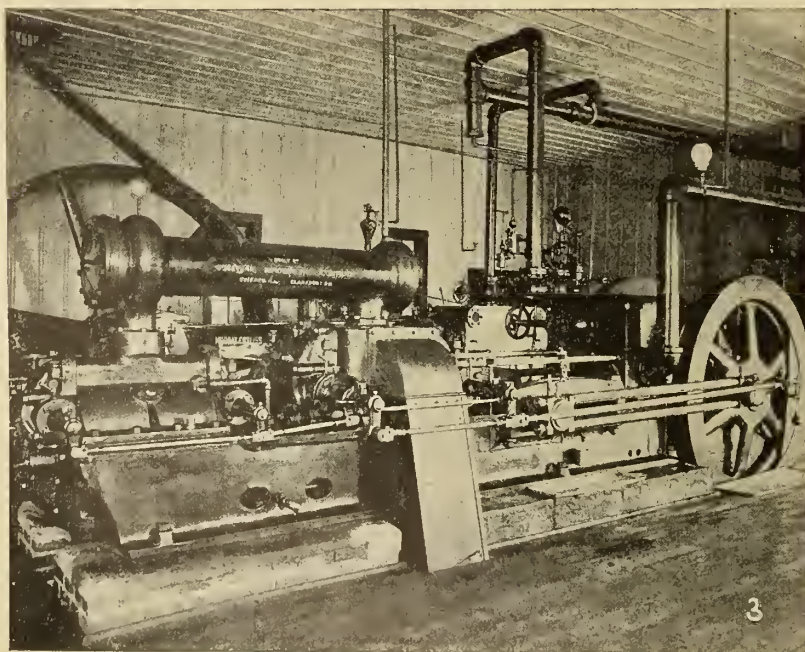
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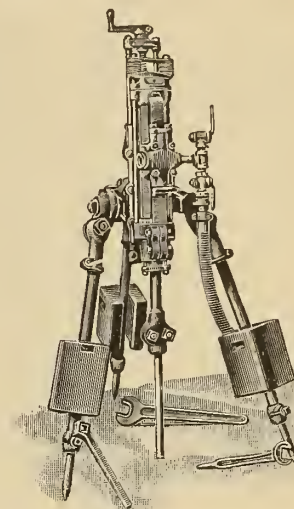


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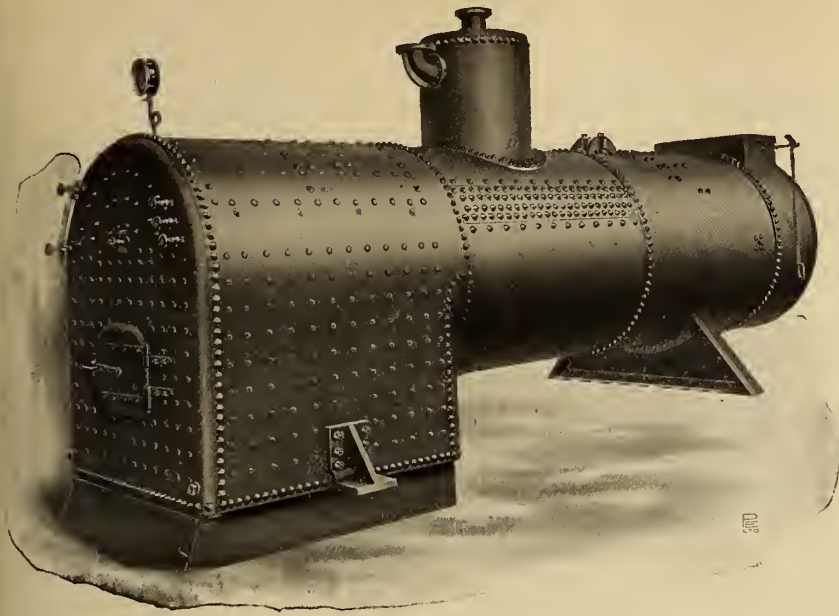
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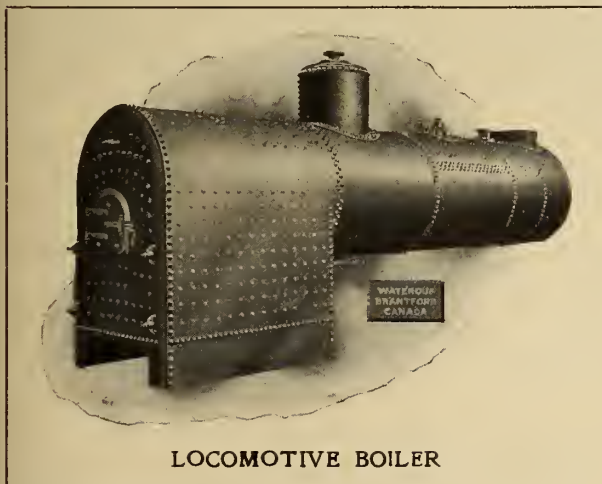
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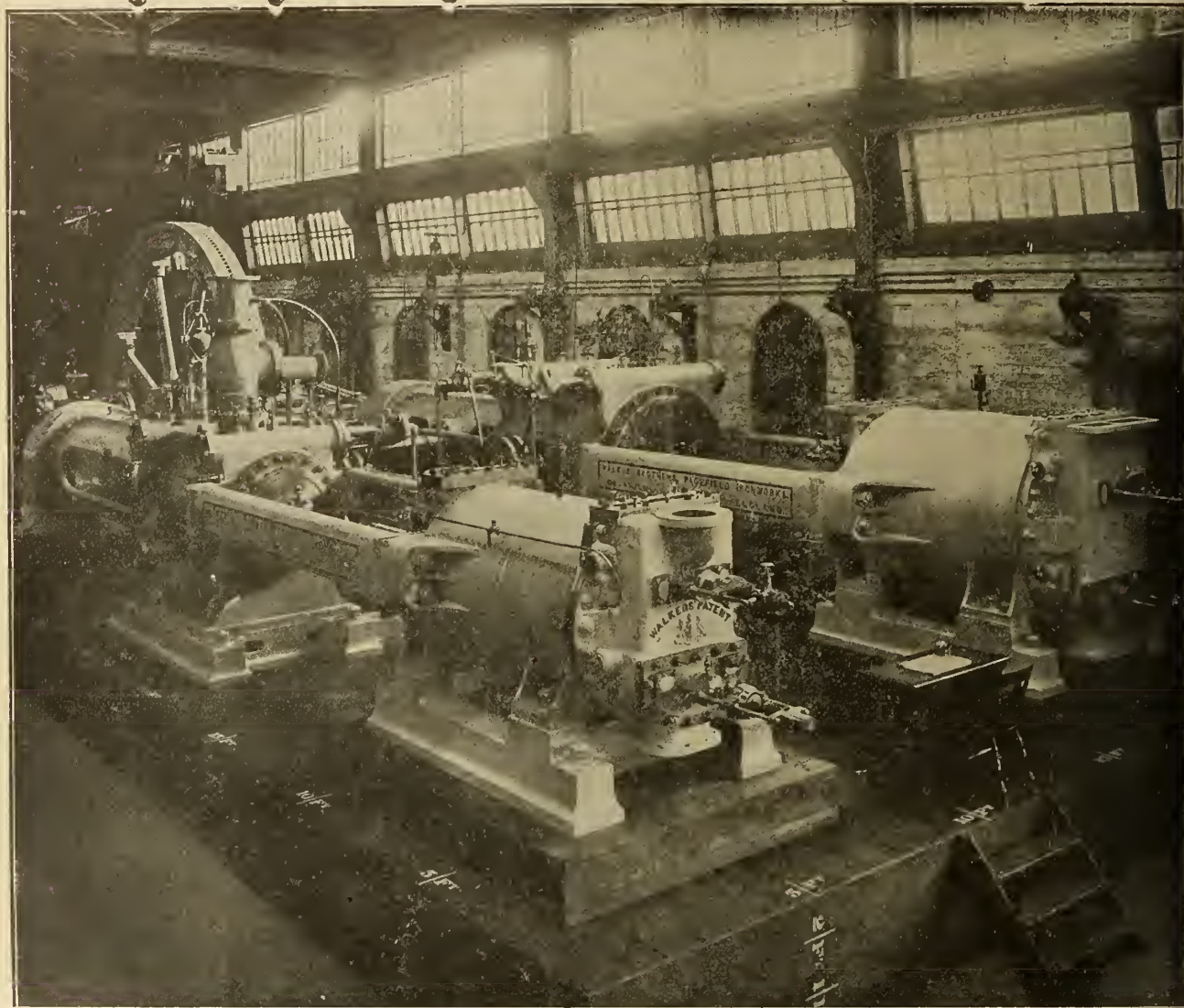
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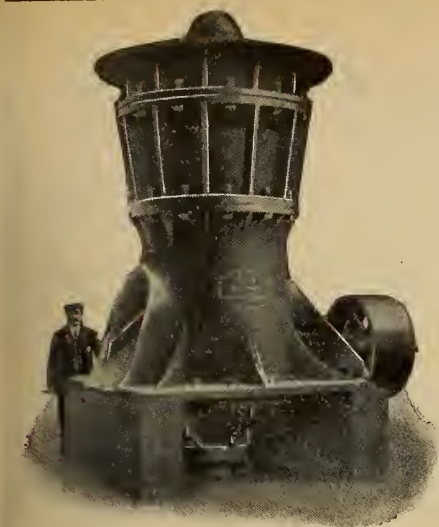
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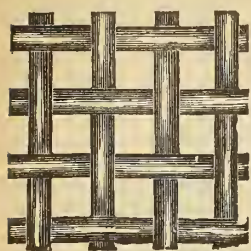
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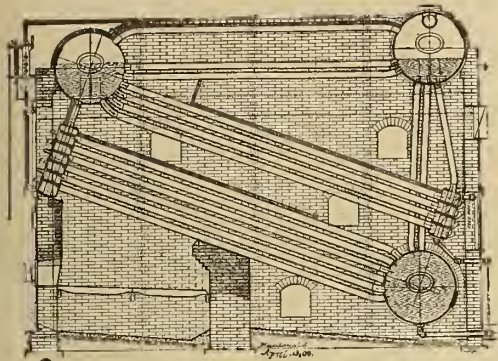
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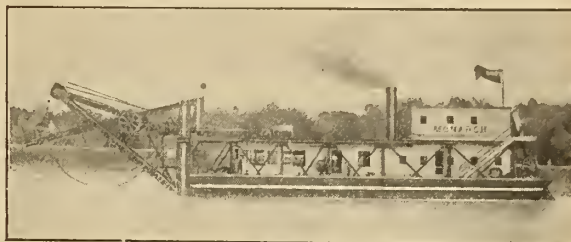
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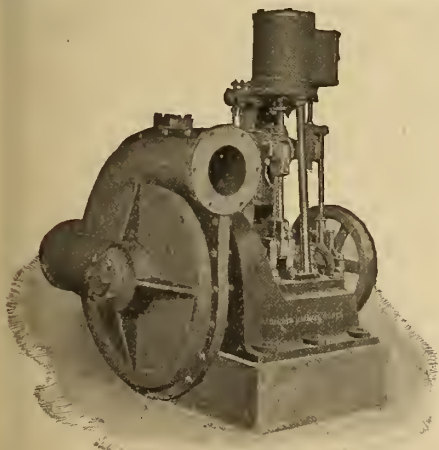
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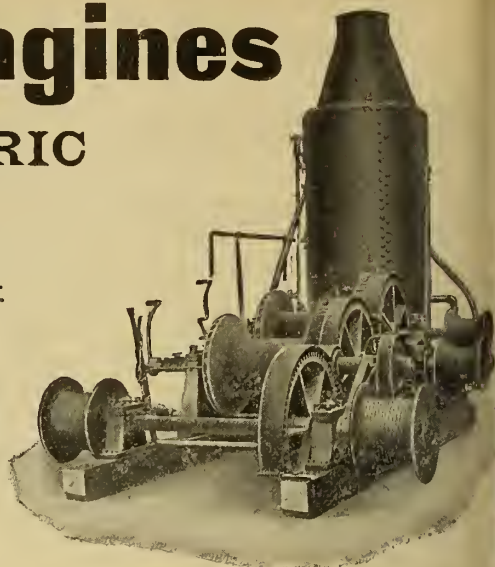
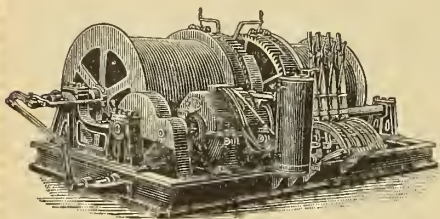
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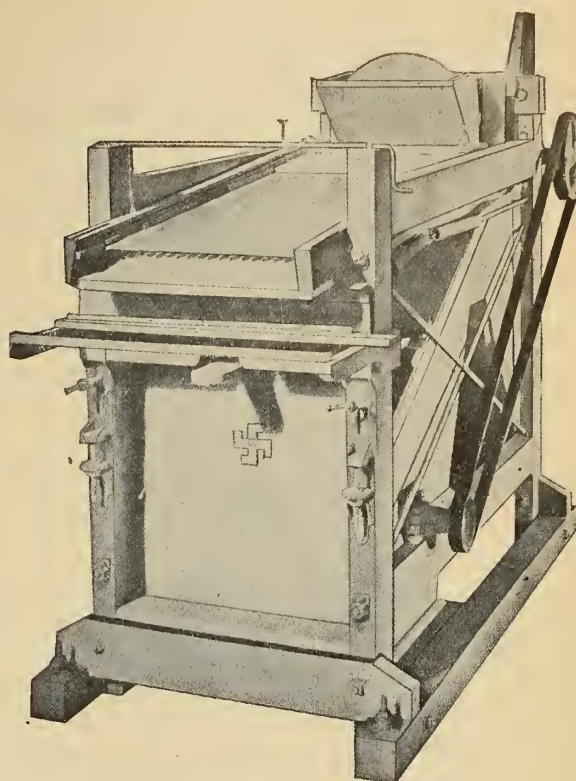
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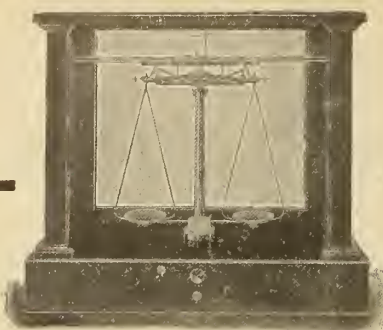
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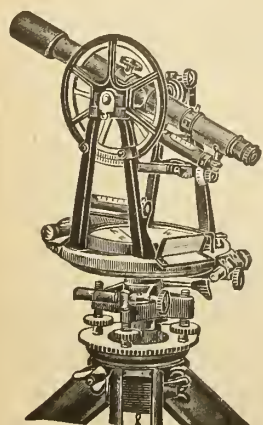


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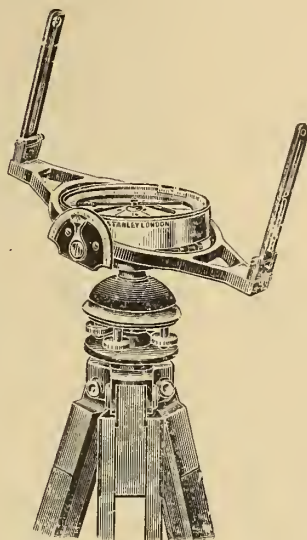
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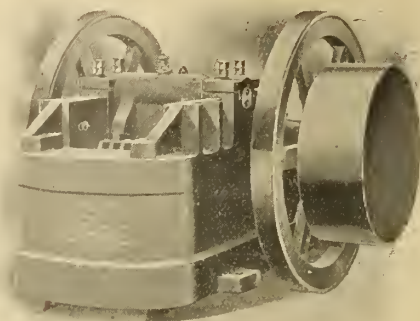
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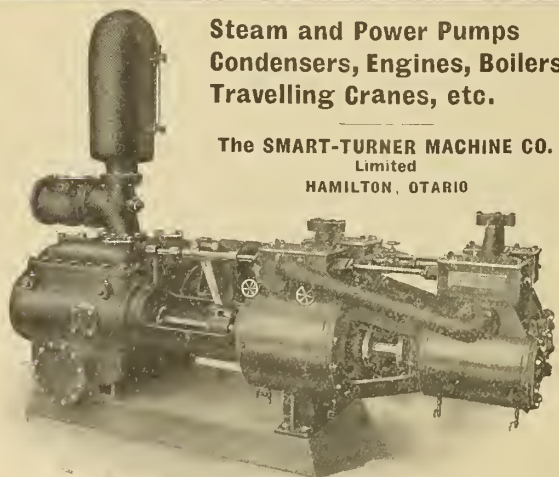
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, June 15, 1909

No. 12

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

**MINES PUBLISHING CO., LIMITED**

*Head Office* . . . Confederation Life Building, Toronto.  
*Branch Offices* Montreal, Halifax, Victoria, and London, Eng.

*Editor:*

J. C. MURRAY, B.A., B.Sc.

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### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

"Entered as second-class matter April 23rd, 1908. at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

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### CONCERNING GEOLOGICAL REPORTS.

A preliminary report on Gowganda Mining Division has been issued by the Geological Survey of Canada. It embodies the results of Mr. W. H. Collins' work during the field season of 1908.

Mr. Collins sketches carefully the general geology of the district. The typical rocks of each formation are discussed. Diabase and aplite come in for a full share of attention. An abstract of some of these pages will be found elsewhere in this issue of the Canadian Mining Journal. We wish to develop a few thoughts inspired by Mr. Collins' remarks on the economic geology of the region.

The field geologist of to-day is expected to keep ever before him the economic side of his work. It is not intended that he should usurp the functions of the prospector or of the mining engineer. Nor can he. Usually in Canada his field is so large and so new that his first few seasons must be devoted to topographic observations, rather than to pure geology.

After determining the topographic features the geologist begins to distinguish, differentiate, and correlate the formations into which the rocks of the region are resolvable.

When the geologist precedes the prospector he is too much absorbed in his duties to permit himself the relaxation of prospecting. When he follows the prospector he must regard the richest silver veins as decidedly of less value to him than a good rock exposure. Veins and other vanities must wait until the broad geological history of his territory has been ascertained. This, at least, was the attitude of the last generation of geologists. We do not mean to imply that commercial phases were totally overlooked. But the purely academic predominated.

Whilst it is apparent that the old order is changing, the readjustment is slow. Habits of thought are persistent. The geological reports of yesterday were strongly academic. To-day they are only less so. Yet the tendency to investigate and emphasize more and more the commercial potentialities of our country has been plainly evident in the operations of the Canadian Survey during the last few years. This does not mean that pure geology is being neglected. There is little danger of that. It does mean that the younger generation of geologists is being trained to correlate geological data and commercial possibilities, that a closer bond is being formed between the Survey and the mining industry.

The effort to develop the economic geology of fields old and new has brought with it complications. Canada is lustily prosperous. It is passing through a period of easy money. Mining enterprise, some of

which are sound, some that are doubtful, and many that will never go farther than the flotation stage, are being put before the public every day. Every prosperous camp or promising new region attracts its quota of reckless promoters, men willing and anxious to use any avenue to wealth. Hence it is imperative that the geologist walk with utmost circumspection when he deals with the geological economics of a new district. He may depend upon it that favourable statements will be separated from their context, that his written opinions will be garbled, and that in every way possible, his report will be used to boom the projects of fakirs.

That this has been recognized is evident from the extreme caution that marks and, possibly, mars the publications of the Ontario Bureau of Mines. It is difficult to say just how far the geologist should go. In our own opinion, while we defer to no one in our appreciation of the Bureau's thoroughgoing honesty and high technical efficiency, we believe that it could have done and can yet do much more towards exposing fraud.

We have alluded to the need of caution and to the undesirability of overmuch caution. It is pertinent to remark here that the official geologist is in danger of becoming proverbial for his skill in hedging. It is pleasing, therefore, to observe that Mr. Collins has said something definite concerning Gowganda. In this he has defied tradition. He has boldly, almost baldly, committed himself to the statement that Gowganda is a district worthy of attention. This is well.

But, while we may justly appreciate Mr. Collins' moral backbone, we may be pardoned if we qualify our appreciation by suggesting that he has fallen into one error. Several of his sentences, if quoted alone, give a quite false impression. These sentences grouped together, could be used to prove that Mr. Collins is highly enthusiastic about Gowganda—which is, of course, not the case.

This all goes to prove that the geologist, when his work impinges directly upon mining, must keep his weather eye open.

It is but fair to say in conclusion that Mr. Collins' report is singularly well written. We do not intend our mild comments to be mistaken for harsh strictures. Our purpose is rather to indicate a dangerous tendency than to exploit a fault.

#### PERMISSIBLE EXPLOSIVES.

The Technologic Branch of the United States Geological Survey is getting down to business. In addition to its labours in the direction of rescue work, it has begun to take up the question of explosives. In Great Britain and on the Continent only such explosives as appear on the "Permitted List" are used in collieries. Permitted explosives are those that give favourable results when subjected to certain tests. On the Continent, especially in Belgium and Germany, these tests are more rigid than those used in Great

Britain. But the general effect is the same. Carelessness is checked, both in the manufacturer and in the user, and human lives are saved.

Now the United States Government has waked to a sense of its duty. It has erected and equipped an Explosives Testing Station at Pittsburg. Here samples, furnished by manufacturers, are tested. A list of explosives that passed the set tests has just appeared. Seventeen brands, tested before May 15, 1909, have met with the approval of the Technologic Branch. Varying the British phrase, the United States authorities have designated these "Permissible Explosives." "Explosives Circular No. I," published by the Technologic Branch of the U. S. Geological Survey, sets forth the conditions and details of tests.

These activities are to be commended unreservedly. It would not be distasteful to us were the Canadian Mines Branch to take up this supremely important line of investigation and regulation. Canada is sadly behindhand.

#### AMALGAMATED ASBESTOS.

The public very rarely learns the full truth concerning mergers. This is especially true of mining mergers.

Shares in Amalgamated Asbestos are now being placed in the principal money markets of the world. The promoters of this particular merger claim that it controls 80 per cent. of Canada's present supply of asbestos. The facts seem to indicate that the merger actually controls less than 50 per cent.

Further inspection points to the probability that costs will be higher and dividends lower than the figures advertised.

But more serious are the indisputable facts that Russia is fast becoming a strong competitor in the production of high-grade asbestos, and that Quebec's output of high-grade is not increasing.

A careful presentation of present conditions will be found elsewhere in this issue. We bespeak for this the closest attention. Unless the statements and logic here set forth can be successfully refuted, there seems to be small hope for the ultimate success of Amalgamated Asbestos. Indeed, to the disinterested observer the whole structure appears top-heavy.

However, the reader may judge for himself.

#### A WESTERN INVASION.

An attempt is being made by the United Mine Workers of America to bring under their control the coal mines of Vancouver Island. The Victoria Daily Colonist earnestly urges the local miners to walk warily and to be sure of their ground before taking a step that would certainly disturb their present peaceful condition.

With the efforts of the United Mine Workers, in so far as these efforts are directed towards Canada, we have absolutely no sympathy. Canadian miners are perfectly able to take care of themselves. Compared



with the labour organizations of the United States, Canadian bodies are cleaner, more independent, and, consequently, much less open to the nefarious manipulation of hired agitators.

Strikes are bad enough, even when there is an honest grievance or a serious difference of opinion as between employee and operator; but when thousands of Canadian miners surrender themselves to a foreign organization that will order wholesale strikes for reasons having not the remotest bearing upon Canadian conditions, then indeed they may expect loss, humiliation, and endless strife.

### ARITHMETIC.

Our industrious contemporary, the Monetary Times, in an idle moment compiled a summary of Cobalt promotions. The totals that it arrived at were only less alarming than its own conclusions.

Records for the past four and one-half years show that 602 companies have been organized, having an aggregate capital of \$504,202,000, and an average capital per company of \$837,544. Dividend returns over the same period represent about 2 per cent. on the total authorized capitalization.

Why the Monetary Times has allowed arithmetic to smother its common sense, we know not, and we regret that some of our English contemporaries have been misguided enough to take the Monetary Times seriously.

The total capitalization shown above has no bearing whatever upon Cobalt. It would easily be possible for promoters to organize Cobalt companies whose total capitalization would run up into billions. The arithmetic employed by the Monetary Times would then bring dividend returns down to some tenuous decimal.

If the figures quoted show anything, they demonstrate the need of closer governmental control of company charters. A large majority of the companies organized to exploit Cobalt's silver never got beyond mere organization. Many of them are merely names. Only a small minority have acquired mining properties. A still smaller proportion are shipping ore and paying dividends.

All of which is so obvious that we apologize to our readers for touching on the matter at all. Our excuse is that Cobalt does not deserve the implied aspersion.

A little arithmetic is a dangerous thing.

### BRITISH COLUMBIA ZINC ORES AND THE U. S. TARIFF.

The provision of the Payne tariff that places a cent a pound on the contained zinc ores carrying 40 per cent. and over, has aroused much adverse comment in British Columbia.

A tariff reduction has been made on low-grade Canadian ores. But is impossible for British Columbia producers to ship ore carrying less than 40 per cent.

zinc at a profit. It is claimed, therefore, that the new tariff simply closes the United States markets to our western producers.

The remedy, as pointed out by Mr. Louis N. Pratt, is the erection of Canadian smelters. The only existing Canadian zinc smelter is the electric plant at Nelson. This has not yet got beyond the experimental stage. While it is hoped and believed that the plant will be successful, yet it is not proven. Meanwhile the province will have to face resolutely the problem of treating its zinc ores.

### "WHICH."

It is no longer fashionable for the mining engineer to be careless as to the language in which he clothes his reports. The time has passed when orthographic solecisms and errors in grammar reflect anything but discredit upon the writer. Yet the majority of technical men fail to pay attention to certain small but important items.

We have not time to elaborate this theme. One example will illustrate our meaning amply. Most writers, technical and otherwise, use the words "which" and "that" interchangeably, or almost so. Preference is generally given to the former word. As a matter of fact, correct usage demands the use of the latter pronoun much more frequently. As pointed out by Mr. T. A. Rickard, a safe rule is to use "that" in every possible case, using "which" only when "that" is obviously unsuitable.

### EDITORIAL NOTES.

Of fourteen representative Welsh, English, and Scotch collieries, eleven reported decreased net profits during the year 1908. The Welsh collieries suffered least. The wide foreign market that they serve placed them above the vicissitudes that hampered and distressed the Scotch producers.

Our Cobalt letter, in the Special Correspondence section, is of more than usual interest. The notes on the power developments are significant. Cobalt is entering upon a new phase of her career. The industrial element is slowly ousting the speculative.

Amongst the British Budget proposals is one imposing a tax on the owners of mining royalties. During a late debate, the Chancellor of the Exchequer pointed out that in most cases land owners demand ten times more money for surface damage than the land is worth for agricultural purposes. The mine owner and the miner contribute to many taxes. The former bears the whole responsibility in the event of failure, accident, or loss from any cause. The royalty owner escapes all risk. Even if the mine is closed he still insists on exacting a dead rent. Hence it is thought perfectly fair to call upon him to make his contribution towards the expenditure of the nation.

In the article entitled "Coinage in the British Empire" which appeared in our issue of May 15th, the author desires to explain that the gold values have been computed at the legal rate of £3 17s. 10½d. per Troy ounce standard, and the silver values at the coinage value of silver in the United Kingdom, namely, £5 6s. per Troy ounce standard. We also wish to point out that through a clerical error the sign of dollars was placed before the figures representing the number of nickel, copper, and aluminium coins turned out of the Royal Mint in 1907.

The action of Minerals Separation, Ltd., against the Ore Concentration Company, Ltd. (Elmore Vacuum),

was discontinued last month. The discontinuance was due, so the former company states, to the fact that the Ore Concentration Company's process is not now being worked commercially at any mine in Great Britain. Minerals Separation, Ltd., is, on the other hand, preparing to proceed against those who are using its processes on a commercial scale in other countries. Against these contentions the Ore Concentration Company, Ltd., advances the statements that three separate Elmore plants are working commercially in Great Britain, treating a total of 40,000 tons of ore per annum, that all the foreign patents purchased by Minerals Separation, Ltd., have lapsed, and that the latter company lost practically every step in its suit and had to pay all costs.

## THE AMALGAMATED ASBESTOS CORPORATION, LIMITED.

(Written for the Canadian Mining Journal by J. J. Harpell.)

From time to time mines and mining prospects in different parts of the world have been subjected to periods of excessive capitalization, flotation and speculation, but probably at no period has any country been so thoroughly given over to the promoter as is Canada at the present time. As soon as one section of the country is "capitalized" until the people are tired reading the advertisements and inspired articles, another section is taken up, in a manner sufficiently different to throw the unsuspecting public off their guard.

During the last few weeks the press has been giving much attention to the "Amalgamated Asbestos Corporation, Ltd." The very glowing accounts of the dividends to be earned by this venture are sufficient to inspire the uninitiated with a desire to subscribe his last dollar; while the statements setting forth how thoroughly the whole asbestos industry of the world will be in the grip of this corporation should fill the user of this material with apprehension of the prices he will have to pay in the future for his supplies.

The following is a quotation taken from one of our soberest publications, "The Financial Post of Canada":—

"... It is understood that the Canadian underwriting of the Amalgamated Asbestos Corporation is closed. The amount subscribed in Canada is over \$2,200,000. England took \$2,000,000 of the underwriting. The American lists will be closed this week.

"In a report made by Mr. Fritz Cirkel, the Government asbestos expert, he estimates the earnings at an amount equivalent to over 14 per cent. on the common stock, giving the figures as follows:—

Receipts for 74,550 tons at \$42.50 per ton. \$3,168,375  
Cost of production at \$20 per ton. . . . . 1,491,000

Total profit for the year. . . . . \$1,677,375

"He adds: 'Knowing from personal investigation in the district the great possibilities of the properties under consideration, I must state that the above

statement of receipts and expenditures is a conservative one, and I am sure that if full advantage is taken of the splendid physical conditions which present themselves for the economical operation of the British-Canadian, the Standard, and the Dominion, and if, furthermore, operating engineering skill were displayed, the cost of production per ton, which I have set down as \$20 in the above statement, will be considerably reduced.

"As to the market for the Canadian article, I may say that I have recently investigated this subject, and I find that since the year 1904 the uses for asbestos—more particularly in the United States—have been almost trebled, especially in the application for building material. This necessitated an increase in the production of all the properties in the district for the last four years of 75 per cent., while the value of the product increased almost 100 per cent. for the same period.'"

The four-page prospectus that is being circulated by the "Amalgamated Asbestos Corporation, Ltd.," contains little or none of the information that the public should have before it is asked to subscribe for stock or bonds in such a corporation. The four pages are filled largely with general statements concerning the asbestos industry and the prospective earnings of the corporation, which, in many instances are misleading.

The capitalization of the corporation is \$25,000,000, made up as follows: \$15,000,000 first mortgage 5 per cent. bonds, of which \$7,500,000 are being offered to the public for immediate subscription, the balance being retained for further requirements; and \$10,000,000 stock, of which \$1,875,000 is preference bearing 7 per cent. cumulative, and the balance being common stock. Annual payments to a sinking fund for the redemption of the bonds are to begin in 1913, and to be equal to 2 per cent. of the par value of the bonds. Thus, the fixed annual charges on the bonds now being issued will amount to \$375,000, and after 1912 to \$525,000. On the preferred stock there will be \$131,250 interest, or alto-



gether \$656,250 will have to be distributed annually before any dividends can be paid on the common stock.

The Board of Directors is composed of sixteen gentlemen, of whom three may be said to be men who have been interested in the production of asbestos. The others are mainly bankers and brokers. One of the above-mentioned three is Dr. R. V. Mattison, of Ambler, Pa., whose interest in the corporation will be referred to subsequently.

The asbestos companies that have been purchased by the Amalgamated corporation, and for which the proceeds of the \$17,500,000 of the capitalization, less \$900,000, which is to be retained as working capital, has been given, are as follows:—

The Kings Asbestos Mines, Thetford Mines, Quebec.

Beaver Asbestos Company, Thetford Mines, Que.

The British-Canadian Asbestos Co., Ltd., Black Lake, Que.

The Standard Asbestos Co., Ltd., Black Lake, Que.

The Dominion Asbestos Co., Ltd., Black Lake, Que., and the

Bell Asbestos Mines, Thetford Mines, Quebec, by a contract for the entire production of the property over and above the manufacturing requirements of the Keasby & Mathison Company, manufacturers of asbestos products, and of the affiliated companies controlled by Dr. R. V. Mattison.

In an interview which the writer had with Dr. Mattison a few days ago he was told that for some time this gentleman has been a greater purchaser than he had been a seller of raw asbestos, and that he had no intention of materially increasing the output of the Bell Asbestos Mines, but on the contrary expected to increase very largely his purchases in the future due to the requirements of the new manufacturing plant he is putting up at Shawinigan, Quebec. It would thus seem that the Amalgamated Corporation must count only on the first five companies mentioned above for their profits.

The bonds alone represent capital invested, all the stock, both preferred and common, being given away either to the promoters or underwriters. Those underwriting the bonds require to deposit only 20 per cent. of their bond subscription with the Royal Trust Company, of Montreal, which company holds in trust all the bonds and stock. The remaining 80 per cent. is evidently provided in some other way. In other words, the Trust Company, either alone or with the assistance of banks or other financial institutions, has undertaken to carry these bonds on margin until they can be unloaded on the public, in the same way that a broker would carry the stock of a client who was speculating in the stock market on margin.

The prospectus further states that according to the statement of a firm of chartered accountants who have examined the books of the companies acquired by the Amalgamated corporation, the aggregate net earnings of these companies for the last year were \$556,000. These profits, it must be remembered, are bookkeeping profits, which are often very different from profits that may be paid out to liquidate fixed charges or to pay dividends.

The remainder of the prospectus is taken up with general statements concerning the asbestos industry and the prospective earnings of the Amalgamated corporation, and winds up as follows:—

"There are three factors in this consolidation which are unique and without parallel:

"1st. There is no known substitute for asbestos.

The demand is constantly increasing and at increased prices.

"2nd. Ninety per cent. of the world's supply of asbestos comes from the Province of Quebec, and principally from Black Lake and Thetford.

"3rd. The Amalgamated Asbestos Corporation, Limited, will control 80 per cent. of the asbestos of these districts, and 70 per cent. of the world's supply."

The writer has recently returned from a trip to Europe, where he spent the greater part of two months in studying the markets for Canadian ores and minerals. Since returning he has visited the asbestos districts of Quebec. On both these trips much information and many statistics were gathered concerning the markets, uses, sources, cost of production, transportation, etc., of asbestos. In the light of these data let us examine some of the above statements of the Asbestos Corporation, as well as the figures advanced by Mr. Cirkel.

Almost every country in the world claims to have asbestos deposits, and from time to time most countries have sent more or less into the market. But the regular producers of appreciable quantities, outside of Canada, have been Italy, Russia, and South Africa. Italy has been a regular producer for years of a superior quality of asbestos. But at no time has her production been large. During the last seven or eight years the Russian asbestos deposits have experienced a very rapid development, due to the advance in the price of the crude article. The cost of production is much less in Russia than in Canada; wages are lower and the percentage of asbestos to a given area is higher. But the cost of transportation is so great that only the superior grades can be shipped. The cost of carrying the Russian material to market is from \$22 to \$25 a ton, as compared with from \$5 to \$7 for marketing the Canadian. In 1908 Canada produced 65,157 tons, of which 47,574 tons was material that on the average was worth less than \$24 a ton. This low-grade material could not have been marketed from the Russian mines. Considering these facts, there is no asbestos district in the world that has increased in the production of the superior grades during the last seven or eight years as have those in Russia. Previous to 1900 the annual output of Russian asbestos was about one thousand tons. In 1907 the output was 10,331 tons. During the same period the output of similar grades of the Canadian material has practically remained the same. In 1900 the output of Canadian No. 1 and No. 2 crude and fibre was 21,613 tons. In 1907 Canada produced 23,830 tons of these grades. In 1908 only 16,582 tons of these grades were produced by Canada—a heavy falling off. (These figures are taken from the Government returns.)

The larger increase in the demand for asbestos during recent years has been in the low grades that are generally known as "paper stock," and that sell for from \$10 to \$30 a ton. For the uses to which these grades are put there seems to be no material that suits the European manufacturer so well as the South African article. It is of lower specific gravity, and the fibre is longer and tougher. These features make it most suitable for mats, etc., for boiler and pipe covering. Owing to the constant and rapid increase in the demand for this article the development of the South African areas, in which it is found, is bound to receive special attention during the next few years and a corresponding increase in the output may be looked for.

From the above figures it will be seen that Russia is at present supplying over fifteen per cent. of the world's output of asbestos. All other countries outside



of Canada are supplying from five to seven per cent. So that Canada supplies the balance, or between 75 and 80 per cent., of which by far the larger part is made up of low-grade material.

Now let us see how much of the Canadian output will be controlled by the new merger. For this purpose we will take the actual shipments made by the companies included in the merger during the last three years. These are as follows:—

|                          | 1906.<br>tons. | 1907.<br>tons. | 1908.<br>tons. |
|--------------------------|----------------|----------------|----------------|
| Kings Asbestos Mines.... | 16,328         | 16,273         | 15,291         |
| Beaver Asbestos Company  | 1,598          | 1,901          | 2,705          |
| British-Canadian .....   | 3,155          | 4,070          | 6,327          |
| Standard .....           | 2,406          | 2,373          | 2,323          |
| Dominion .....           | ....           | ....           | 87             |
| Total .....              | 23,487         | 24,617         | 27,733         |

The total production of Canadian asbestos in 1906 was 61,675 tons; in 1907 it was 61,985 tons, and in 1908 it was 65,157 tons. So that the companies now included in the merger controlled 38 per cent. of the Canadian output in 1906. They controlled 40 per cent. in 1907, and in 1908 they controlled 42½ per cent. The Amalgamated thus occupies a position quite different from that which its promoters have claimed for it.

Now let us analyze some of Mr. Cirkel's statements. He assumes that the new merger will produce 74,550 tons. To increase their present production to this figure they will require to do one of two things; they will either have to acquire control of the whole of the Canadian output or else increase their own output up to this point. If they increase their own output and find a market for it, no doubt, in the natural course of events the other companies that are now in the field will be doing likewise, so that when the Amalgamated reaches Mr. Cirkel's figures, the whole of the Canadian output will be over twice that tonnage. To market such an output would be an impossibility for some time to come. The output has always kept pace with the demand. In fact, it has kept slightly ahead of it. Very frequently mills have had to be closed earlier in the season than they might, because of the fact that their storehouses were full, and to attempt to empty them by forcing the material on the market would mean a reduction in price below the point at which there would be a profit. The only other way by which the Amalgamated can reach Mr. Cirkel's estimate is by acquiring control of the balance of the Canadian output. But here again Mr. Cirkel's figures are upset. It requires \$7,500.00 of bonds and \$10,000,000 of stock to control 42½ per cent. of the Canadian output; how much will it take to control the whole of it? If it takes annual fixed charges amounting to \$656,250 to control 42½ per cent. of the output, it will require over a million and a half of annual fixed charges to control the whole of it. Then again his price of \$42.50 per ton is too high when it is remembered that any material increase in tonnage will be in the grades averaging under \$24 per ton. On the other hand, his cost of production is very much too low. In 1903 the cost per ton during the month of August in one of the best mines in the district was \$18.56. Considering that this was for a month which would have the maximum output of any month in the year, as well as the minimum cost, and also considering that this was for one of the best mines and mills in the district it is reasonable to expect that the average cost per ton for all the mines over the whole of 1903 was more than this. Since 1903 the cost

of production has considerably increased, largely due to the increased cost of labour.

The writer has before him sheets showing the cost of production during a number of periods. From these figures he finds that in every case the item of "wages and salaries" equals a little more than half the total cost of production. According to the returns made to the Quebec Government, the wages paid by all the asbestos mines in 1908 amounted to \$1,066,774. Twice this would bring the total cost of production in 1908 up to \$2,133,548. According to the same report, the total was \$2,577,302. On this basis the net profit on the whole of the Canadian asbestos industry would be somewhere between four hundred thousand and half a million dollars. Of this profit the companies now in the merger would receive in the neighbourhood of \$200,000.

The asbestos industry of Canada is no mint. It is only sufficiently profitable to make a good healthy business. It is true that during recent years there has been a decided increase in the demand for asbestos and a corresponding increase in the price. But the main advance in price has been for the superior grades, such as crude No. 1 and No. 2 and fibre, in which grades, it must be remembered, there has been no increase in the Canadian production. All the increase in the Canadian production has been in the lower grades of "paper stock," as may be seen from the following figures taken from the Government returns:—

|         | No. 1<br>Crude. | No. 2<br>Crude. | Fibre. | Total<br>Superior<br>grades. | Paper<br>stock. |
|---------|-----------------|-----------------|--------|------------------------------|-----------------|
| 1900... | 1,755           | 3,490           | 16,368 | 21,613                       | ....            |
| 1901... | 2,083           | 2,660           | 14,639 | 19,382                       | 14,054          |
| 1902... | 1,319           | 3,131           | 15,502 | 19,952                       | 10,682          |
| 1903... | 930             | 2,354           | 9,150  | 12,434                       | 16,327          |
| 1904... | 1,646           | 2,727           | 7,771  | 12,143                       | 23,336          |
| 1905... | 1,640           | 2,253           | 10,707 | 14,600                       | 34,655          |
| 1906... | 1,477           | 2,450           | 18,542 | 22,469                       | 39,306          |
| 1907... | 1,487           | 2,938           | 19,905 | 24,330                       | 37,655          |
| 1908... | 900             | 2,771           | 13,911 | 17,582                       | 47,574          |

In 1903 the average prices of the different grades were as follows:—

Crude No. 1, \$126.50; crude No. 2, \$110.40; fibre, \$34; paper stock, \$16.

In 1908 the average prices were:—

Crude No. 1, \$290.00; crude No. 2, \$160.00; fibre, \$52.00; paper stock, \$23.86.

These figures will indicate the cause for the very rapid increase in the production of the Russian material. The Russian deposits are extensive and exceptionally rich, but the material is not so good as is the Canadian for textile purposes. At the prices that prevailed previous to five or six years ago it could not be marketed in competition with the Canadian article. But as soon as the prices went up the Russian article began to come into the market in large quantities, and in eight years the output increased about ten times. At present the Russian No. 1 crude is selling at from \$200 to \$225 a ton. The same thing is likely to happen in the lower grades as soon as the prices of these grades reach a figure at which the Russian article can be marketed profitably. The prices for these grades will not need to advance much farther before this point is reached; because the lower grades of the Russian article compare more favourably with the lower grades of the Canadian article than do the higher grades. Then, of course, there is the South African article, which seems to be better adapted for the uses to which the so-called



"paper stock" is put than any other class on the market. Already the increased prices and the demand for this material are quickening the activities in the South African asbestos industries. These are features which the Canadian producers must take into consideration.

During the last eight or ten years the cost of production in Canada has very materially increased, and through no fault of the asbestos producers. The whole cause lies in the phenomenal advance there has been in the cost of living, until now the cost of living in Canada is the highest of any country in the world. This is mainly due to national causes, both economic and sociological, which will be discussed in another article in the subsequent number of this journal. The labourer in the asbestos districts of Canada gets \$1.75 cents a day, and he cannot live on less. Similar labourers in the United States, we are credibly informed, receive \$1.50 a day.

In Russia they get from 30 to 40 cents a day. This is the one feature of the Canadian asbestos industry that deserves attention.

The prices that have been paid by the promoters of the Amalgamated Asbestos Corporation, Ltd., for the properties they have acquired are exorbitant. In order to meet the excessive fixed charges many expedients will require to be resorted to which will both retard the production of Canadian asbestos and encourage the production of other countries. If there should be a failure to meet these fixed charges, of course, the corporation goes into the hands of a receiver and possibly into liquidation. In this way large producing areas will become tied up in litigation, and the industry will be seriously injured. From every point of view it would be a sad mistake if any such fate should befall the asbestos industry of Canada.

## MINING OPERATIONS IN THE PROVINCE OF QUEBEC FOR THE YEAR 1908.

Abstract of the Official Report of Superintendent of Mines J. Obalski, M.E.

Notwithstanding the financial depression, the Province of Quebec did not fall off in mineral production during 1908. Instead of a falling off, a gain of nearly half a million dollars was made. The output of Quebec mines for 1907 was valued at \$5,019,932; for 1908 the corresponding figure is \$5,493,664.

### Iron.

The charcoal blast-furnaces of the Canada Iron Furnace Company, Ltd., and of John McDougall & Co., at Radnor and Drummondville respectively, have been purchased, and are being operated by the Canada Iron Corporation, Ltd. They are now units in an organization that extends over practically the length of Canada.

Local bog ore is used exclusively at Drummondville. At Radnor, as a mixer with bog ore, Ontario magnetite is utilized. Ore is also imported in small quantities from the United States.

The output of the furnaces is reported as follows:—

|                                                 |          |
|-------------------------------------------------|----------|
| ore charged, 15,493 short tons, worth.....      | \$60,020 |
| limestone charged, 2,887 short tons, worth....  | 1,337    |
| charcoal, 977,840 bushels of 20 lbs., worth.... | 85,738   |
| pig iron produced, 5,989 gross tons, worth....  | 171,286  |

The furnaces employ hot blast. Wood charcoal is manufactured on the spot in close kilns. Limestone is obtained from local sources.

Mr. Obalski makes his annual reference to the magnetic sands of the North Shore. "Experiments [in electric reduction] . . . have been made by the Federal Government, which attest the value of the process, but do not seem to demonstrate its industrial utility." Mr. Obalski is of opinion that the Grondal process may be commercially applicable.

### OCHRE.

The working of ochre at St. Malo and at Champlain, in the neighborhood of Three Rivers, has been continued. The operating concerns are the Canada Paint Company, Champlain Oxide Company, and S. W. McGill. The output for 1908 was 1,500 tons of crude ochre, worth \$4,500, and 1,346 tons of calcined and

ground ochre worth \$15,440. Sixty-one men are employed, and work is carried on for about seven months of the year.

### Chrome.

Only two companies produced chrome ore during 1908. These were the Dominion Chrome Company, at Little Lake St. Francis; and the Black Lake Chrome and Asbestos Company, at Black Lake. Both properties are under the same management. The concentration mills worked seven to ten months of the year.

The mills and mines of the American Chrome Company and of the Canadian Chrome Company were idle. These will probably resume work during this year.

A new company, D'Israeli Chrome Mines, Ltd., is exploiting a deposit in Lot V., 37, of Garthby. Prospecting has been done with encouraging results in Coleraine and Bolton.

The production of chrome in 1908, in long tons, was:—

|                            |            |                |
|----------------------------|------------|----------------|
| Second-class in lumps..... | 3,754 tons | worth \$38,740 |
| Concentrates . . . . .     | 3,000 " "  | 45,000         |
| Total . . . . .            | 6,754      | \$83,740       |

Seventy men were employed, and received wages totalling \$32,000. Work occupied only half the year.

### Copper.

The Eustis mine, at Capelton, was the only producer of copper. The Nichols Company's mines were shut down. The last-named company has been reorganized and has assumed a new name, the Albert Copper Company. The manufacture of sulphuric acid and other chemical products still continues.

Mr. Obalski advocates the establishment of a copper smelter at a central point in the Eastern Townships.

Copper ore shipped during 1908 amounted to 26,598 short tons, worth \$159,588. One hundred and twenty-two men were employed. They received \$50,030 in wages.

Lead, zinc, cobalt, silver, showed no further devel-

opment, although in the Township of Fabre prospecting results are encouraging.

### Gold.

At Lake Megantic the Marsboro Gold Fields Company continued to sink a shaft on Lots V., 1920, of Marston. The shaft is now 50 feet deep, and tests are being made. Definitive results have not been obtained as yet.

The Compton Gold Dredging Company proposes to dredge the gravel deposits in the valley of the Moe's River. Future results can only be guessed at.



J. OBALSKI.

Superintendent of Mines for the Province of Quebec.

### Asbestos.

Work was continued as usual in the asbestos districts.

At Thetford the Bell, King, Johnson, and Beaver mines were in regular operation. At the Beaver a new electric plant was erected. The Thetford Asbestos Exploration Company is preparing to work its property on Lot 28, Range VI., of Thetford. On Lot 16, Range IV., three miles from Robertson Station, the Robertson Asbestos Mining Company has done sufficient prospecting to encourage the erection of a mill.

On Lot 17, Range IV., some good prospects of excellent asbestos have been found. There is also a vein of chrome iron ore on this lot. There are many other partly developed prospects.

The American Asbestos Company, at Black Lake has changed its name to the British-Canadian Asbestos Company, Limited. The Union mine resumed work. This company does not ship its crude asbestos, but runs it all through the mill, and prepares a special quality of fibre.

Further notes of progress, discoveries, and additions to plants are given by Mr. Obalski. In his opinion, the asbestos industry gave good results during 1908.

The production for 1908 was as follows:—

|                          |                 |            |
|--------------------------|-----------------|------------|
| First-class crude .....  | 900 tons, worth | \$261.21   |
| Second-class crude ..... | 2,771 " "       | 438.30     |
| Fibre .....              | 13,911 " "      | 716.81     |
| Paper stock .....        | 47,574 " "      | 1,135.26   |
| <hr/>                    |                 |            |
| Total .....              | 65,157          | \$2,551.59 |
| Asbestic .....           | 24,011          | 34.66      |

Total value .....\$2,577.30

Four thousand two hundred and eighty-four workmen received \$1,066,774 in wages. It is noted that the increased output is chiefly paper stock.

Reference is made to the possibility of Russian Asbestos entering into strong competition with the Canadian article. In 1907, the production of the Ure region was 10,000 tons.

### Mica.

A bad market influenced this branch of the industry adversely. Only a few mines were worked. Among the principal shippers were Blackburn Brothers, H. I. Flynn, Kent Brothers, W. Argall, and the Calumet Mining Company. A large quantity remains on hand for this year's shipments. The total shipments of thumb-trimmed mica was 106 tons, worth \$95,311. One hundred and eighty-four men were employed. Work was intermittent. The amount expended in wages was \$47,724.

### Phosphate.

The Chemical and Fertilizer Company, of Buckingham, used 90 tons of phosphate. The Electric Reduction Company, of the same place, used tons. The whole amount, 175 tons, was worth \$1,610.

### Graphite.

Practically no graphite was mined during 1908.

### Magnesite.

In the year 1900 a considerable deposit of magnesite was found in the northern half of Lot 18, Range XI., Grenville Township, Argenteuil County. Very little attention was attached to it. Samples from this and other contiguous localities ranged from 74 per cent to 99.92 per cent, carbonate of magnesia.

In 1907, the lot mentioned above was acquired by Mr. T. J. Waters. A 200-ton test shipment was made and a quantity was calcined by the Canadian Carbonate Company, of Montreal.

The crude magnesite showed thus:—

|                             |                |
|-----------------------------|----------------|
| Carbonate of magnesia ..... | 84.50 per cent |
| Carbonate of lime .....     | 15.00 " "      |

The calcined product gave on analysis:—

|                |                |
|----------------|----------------|
| Magnesia ..... | 74.84 per cent |
| Lime .....     | 10.84 " "      |



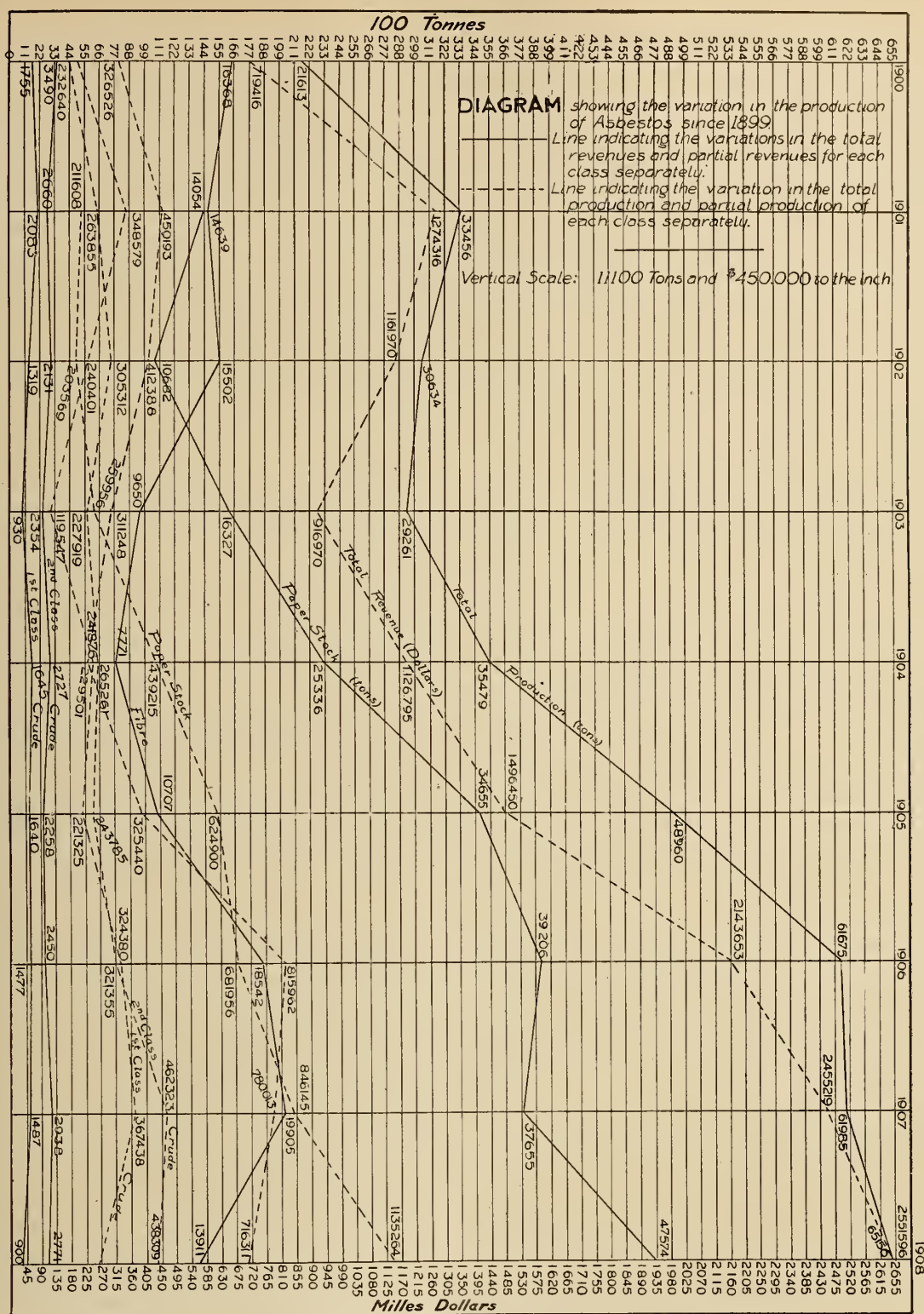


DIAGRAM OF QUEBEC ASBESTOS PRODUCTION.

The mine lies 14 miles from the C. P. R. station, Calumet. Magnesite crops out over a length of from 400 to 500 feet, showing a width in one place of 60 feet. It has a snow-white crystalline form. A sample analyzed by Dr. Milton L. Hersey showed 86.60 per cent. carbonate of magnesia, and 11.43 per cent. carbonate of lime. The mineral can be used as a source of carbonic acid gas, and of magnesia. It also is easily worked for ornamental purposes. It has many other commercial uses, including the manufacture of

floor material. This is one of the very few large occurrences in Canada.

In Montreal, the Canadian Carbonate Company makes liquid carbonic acid out of European magnesite. Crude magnesite is worth about \$8 per ton. The calcined product fetches from \$30 to \$35 per ton. There is no duty on the entry of this product into the United States.

There appears to be the basis of a sound industry provided here.

Lists of operating companies, reports of official explorations in Labrador and Chebougaman complete Mr. Obalski's report.

### Statistics.

#### Summary Statement of the Production of the Mines of the Province of Quebec for the year 1908.

| NATURE OF MINERALS.<br>(Tons of 2000 lbs.) | Wages<br>paid. | Number<br>of<br>workmen | Quantities<br>shipped or<br>used | Gross<br>value |
|--------------------------------------------|----------------|-------------------------|----------------------------------|----------------|
| Bog iron ore .....                         | \$41,054       | 170                     | 11,628                           | \$30,957       |
| Calcined ochre .....                       | 12,596         | 61                      | 1,346                            | 15,440         |
| Raw ochre .....                            | .....          | ...                     | 1,500                            | 4,500          |
| Chrome iron .....                          | 32,000         | 70                      | 7,564                            | 83,740         |
| Copper ore .....                           | 50,030         | 122                     | 26,598                           | 159,588        |
| Asbestos .....                             | 1,006,774      | 2,484                   | 65,156                           | 2,551,596      |
| Trimmed mica .....                         | 47,724         | 184                     | 106                              | 95,311         |
| Phosphate of lime.....                     | .....          | ...                     | 175                              | 1,610          |
| Magnesite .....                            | .....          | ...                     | 65                               | 520            |
| Slates (squares) .....                     | 15,000         | 50                      | 4,335                            | 20,056         |
| Prepared graphite (lbs)                    | 6,920          | 22                      | 2,640                            | 165            |
| Flag-stone (sq. yds.)..                    | 2,400          | 50                      | 4,335                            | 3,600          |
| Cement (barrels) .....                     | 151,716        | 395                     | 801,695                          | 1,127,335      |
| Granite (cubic yds.)..                     | 238,761        | 653                     | 30,000                           | 250,000        |
| Lime (bushels) .....                       | 33,500         | 124                     | 556,000                          | 96,000         |
| Bricks .....                               | 300,000        | 1,462                   | 94,000,000                       | 525,00.        |
| Tiles and pottery .....                    | .....          | ...                     | .....                            | 270,000        |
| Lime stones (c. yds.)..                    | 155,882        | 515                     | 97,710                           | 223,580        |
| Totals .....                               | \$2,094,357    | 6,324                   |                                  | \$5,493,580    |

This table shows that the value of the mining products for 1908 was \$5,493,664, representing the value of the raw material or after having undergone the necessary preparation to make it merchantable.

This industry gave employment to 5,324 men, receiving \$2,094,357 in wages and working for periods of from 4 to 12 months.

According to the reports received, 7 men were killed and 5 seriously wounded in mining accidents.

### THE QUEBEC MINING LAW AS IT STANDS AT PRESENT.

1. The mines are reserved by the Crown on all the Crown lands and on the lands sold or patented for farming or other purposes after the 24th July, 1880, the owner of the surface having no right whatever thereon except to the damages. The land needed for mining may be expropriated by arbitration process before the Department of Mines.

2. Gold and silver are reserved by the Crown on all the lands, whatever may be the date of the patent.

3. Surface and underground may form one property, but can be separated in order to form two distinct properties, according to the wish of the owner.

4. The whole Province, surveyed or unsurveyed, is open for prospecting, except on territory already alienated for mining.

5. The staking out of a claim can be done only and personally by a prospector holding a miner's certificate. The cost of such certificate is \$10, good until the 31st December.

6. The staking out can be done on claims having an area varying from 40 acres to 200 acres in unsurveyed territory and on specified lots from one to two lots, forming a maximum of 200 acres. Within four months of the staking out, a mining license must be taken (a) on surveyed territory for the claim as staked out; (b) on surveyed territory for lots or fractions of lots, containing an area of from 1 to 200 acres.

7. In unsurveyed territory the claim must be rectangular in form, with north-south and east-west

orientation, and in surveyed territory the mining license will be bounded by lines parallel to the outlines of the lots, and the description must be furnished to the satisfaction of the Minister.

8. No evidence of discovery, assessment works or surveying is required in order to secure a mining license, but a fee of \$10, plus a rental of \$1 per acre per year, has to be paid in advance, and the same is renewable, so long as the necessary amount is paid to this Department.

10. The mine may be purchased upon payment of \$10 or \$20 an acre respectively within or outside of 20 miles in a straight line from a railroad in operation, the above being for a full claim or an entire 100-acre lot. The applicant must produce the proof of a mineral discovery, the concession has to be surveyed, and an amount of \$500 spent in mining work before the patent can be issued. On Crown land, the surface is sold with the mine, and on private land only the underground property, part of the surface being liable to expropriation, should same be necessary.

11. All applications and recording must be made through correspondence with the Department of Mines at Quebec until otherwise announced.

12. The prospecting license system has been abandoned, but the actual holders will keep the benefit of the same, and will have the right to renew them until the 1st of January, 1910.

### JAPAN'S STEEL, IRON, AND COAL.

The future that lies before Japan's mining and metallurgical industries is appreciated by very few outsiders. Geographically, Japan's position is most advantageous. Her climate is favourable. Her national progress in the production and utilization of minerals has been phenomenal.

In the period 1896-1900, inclusive, Japan produced 6,613,000 tons of coal. In 1907 her production amounted to 13,716,000 tons. During the first half of 1908 her estimated production was 7,000,000 tons. The average price of coal at the pit mouth is about \$2.25 per ton. During 1907 exports amounted to 2,922,000 tons, being about \$2.70 per ton; 141,000 tons were shipped to the Pacific Coast of the United States.

Most of the coal mines are on the seaboard. The seams range from 3 feet to 8 feet in thickness, and are easily worked; 60,000 miners are employed. The largest coal mine produces 1,100 tons daily. The yearly output per man employed is 240 tons. Coal-cutting machinery is now being introduced. Heretofore practically all the cutting has been done by hand.

The estimated available deposits of coal are put down at 1,200,000,000 tons.

In the southwest near the port of Sakai, rich deposits of iron ore have been found. Other deposits are known. Apparently none of these is yet worked. For the production of pig iron—42,919 tons in 1907—Chinese ore is imported. The Chinese ore is very rich. It is said to average 65 per cent. of iron. Domestic pig iron and steel sell at about \$24.50 and \$37 per ton respectively. Every effort is being made to increase production and to cheapen costs.

The Government steel works, at Yawata, employs 7,000 men. Three blast furnaces turn out a combined daily output of 450 tons. All branches of the steel industry are included in the establishment.



# LIST OF PERMISSIBLE EXPLOSIVES.

Tested prior to May 15, 1909.

As a part of the investigation of mine explosions authorized by Congress in May, 1908, it was decided by the Secretary of the Interior that a careful examination should be made of the various explosives used in mining operations, with a view to determining the extent to which the use of such explosives might be responsible for the occurrence of these disasters.

The preliminary investigation showed the necessity of subjecting to rigid tests all explosives intended for use in mines where either gas or dry inflammable dust is present in quantity or under conditions which are indicative of danger.

With this in view, a letter was sent by the Director of the United States Geological Survey on January 9, 1909, to the manufacturers of explosives in the United States, setting forth the conditions under which these explosives would be examined and the nature of the tests to which they would be subjected.

Inasmuch as the conditions and tests described in this letter were subsequently followed in testing the explosives given in the list below, they are here reproduced, as follows:—

(1) The manufacturer is to furnish 100 pounds of each explosive which he desires to have tested; he is to be responsible for the care, handling, and delivery of this material at the testing station on the United States arsenal grounds, Fortieth and Butler Streets, Pittsburg, Pa., at the time the explosive is to be tested; and he is to have a representative present during the tests, who will be responsible for the handling of the packages containing the explosives until they are opened for testing.

(2) No one is to be present at or to participate in these tests except the necessary government officers at the testing station, their assistants, and the representative of the manufacturer of the explosives to be tested.

(3) The tests will be made in the order of the receipt of the applications for them, provided the necessary quantity of the explosives is delivered at the plant by the time assigned, of which due notice will be given by the Geological Survey.

(4) Preference will be given to the testing of explosives that are now being manufactured and that are in that sense already on the market. No test will be made of any new explosive which is not now being manufactured and marketed, until all explosives now on the market that may be offered for testing have been tested.

(5) A list of the explosives which pass certain requirements satisfactorily will be furnished to the state mine inspectors, and will be made public in such further manner as may be considered desirable.

## Test Requirements for Explosives.

The tests will be made by the engineers of the United States Explosives Testing Station at Pittsburg, Pa., in gas and dust gallery No. 1. The charge of explosive to be fired in tests 1, 2, and 3 shall be equal in disruptive power to one-half pound (227 grams) of 40 per cent. nitroglycerin dynamite in its original wrapper, of the following formula:—

|                             |     |
|-----------------------------|-----|
| Nitroglycerin . . . . .     | 40  |
| Nitrate of sodium . . . . . | 44  |
| Wood pulp . . . . .         | 15  |
| Calcium carbonate . . . . . | 1   |
|                             | —   |
|                             | 100 |

Each charge shall be fired with an electric fuse of sufficient power to completely detonate or explode the charge, as recommended by the manufacturer. The explosive must be in such condition that the chemical and physical tests do not show any unfavorable results. The explosive in which the charge used is less than 100 grams (0.22 pound) will be weighed in tinfoil without the original wrapper.

The dust used in tests 2, 3, and 4 will be of the same degree of fineness and taken from one mine.\*

Test 1.—Ten shots with the charge as described above, in its original wrapper, shall be fired, each with 1 pound of clay tamping, at a gallery temperature of 77 degrees F., into a mixture of gas and air containing 8 per cent. of methane and ethane. An explosive will pass this test if all ten shots fail to ignite the mixture.

Test 2.—Ten shots with charge as previously noted, in its original wrapper, shall be fired, each with 1 pound of clay tamping at a gallery temperature of 77 degrees F., into a mixture of gas and air containing 4 per cent. of methane and ethane and 20 pounds of bituminous coal dust, 18 pounds of which is to be placed on shelves laterally arranged along the first 20 feet of the gallery, and 2 pounds to be placed near the inlet of the mixing system in such a manner that all or part of it will be suspended in the first division of the gallery. An explosive will pass this test if all ten shots fail to ignite the mixture.

Test 3.—Ten shots with charge as previously noted, in its original wrapper, shall be fired, each with 1 pound of clay tamping at a gallery temperature of 77 degrees F., into 40 pounds of bituminous coal dust, 20 pounds of which is to be distributed uniformly on a horse placed in front of the cannon and 20 pounds placed on side shelves in sections 4, 5, and 6. An explosive will pass this test if all ten shots fail to ignite the mixture.

Test 4.—A limit charge will be determined within 25 grams by firing charges in their original wrappers, untamped, at a gallery temperature of 77 degrees F., into a mixture of gas and air containing 4 per cent. of methane and ethane and 20 pounds of bituminous coal dust, to be arranged in the same manner as in test 2. This limit charge is to be repeated five times under the same conditions before being established.

Note.—At least 2 pounds of clay tamping will be used with slow-burning explosives.

In response to the above communication applications were received from 12 manufacturers for the testing of 29 explosives. Of these explosives, the 17 given in the following list have passed all the test requirements set forth, and will be termed permissible explosives.

Subject to the conditions named below, a permissible explosive is defined as an explosive which has passed gas and dust gallery tests Nos. 1, 2, and 3 as

\*With a view to obtaining a dust of uniform purity and inflammability.



described above, and of which in test No. 4  $1\frac{1}{2}$  pounds (680 grams) of the explosive has been fired into the mixture there described without causing an ignition.

#### Permissible Explosives tested prior to May 15, 1909.

Aetna coal powder A. Aetna Powder Co., Chicago, Ill.  
 Aetna coal powder B. Aetna Powder Co.  
 Carbonite No. 1. E. I. Du Pont de Nemour Powder Co., Wilmington, Del.  
 Carbonite No. 2. E. I. Du Pont de Nemours Powder Co.  
 Carbonite No. 3. E. I. Du Pont de Nemours Powder Co.  
 Carbonite No. 1 L. F. E. I. Du Pont de Nemours Powder Co.  
 Carbonite No. 2 L. F. E. I. Du Pont de Nemours Powder Co.  
 Coal special No. 1. Keystone Powder Co., Emporium, Pa.  
 Coal special No. 2. Keystone Powder Co.  
 Coalite No. 1. Potts Powder Co., New York City.  
 Coalite No. 2 D. Potts Powder Co.  
 Collier dynamite No. 2. Sinnamahoning Powder Co., Emporium, Pa.  
 Collier dynamite No. 4. Sinnamahoning Powder Co.  
 Collier dynamite No. 5. Sinnamahoning Powder Co.  
 Masurite M. L. F. Masurite Explosive Co., Sharon, Pa.  
 Meteor dynamite. E. I. Du Pont de Nemours Powder Co.  
 Monobel. E. I. Du Pont de Nemours Powder Co.  
 Provided:

1. That the explosive is in all respects similar to the sample submitted by the manufacturer for test.
2. That double-strength detonators are used of not less strength than 1 gram charge consisting by weight of 90 parts of mercury fulminate and 10 parts of potassium chlorate (or its equivalent), except for the explosive "Masurite M. L. F." for which the detonator shall be of not less strength than  $1\frac{1}{2}$  grams charge.
3. That the explosive, if in a frozen condition, shall be thoroughly thawed in a safe and suitable manner before use.
4. That the amount used in practice does not exceed  $1\frac{1}{2}$  pounds (680 grams) properly tamped.

The above partial list includes the permissible explosives that have passed these tests prior to May 15, 1909. The announcement of the passing of like tests by other explosives will be made public immediately after the completion of the tests for such explosives.

A description of the method followed in making these and the many additional tests to which each explosive is subjected, together with the full data obtained in each case, will be published by the Survey at an early date.

#### Notes and Suggestions.

It may be wise to point out in this connection certain differences between the permissible explosives as a class and the black powders now so generally used in coal mining, as follows:—

(a) With equal quantities of each, the flame of the black powder is more than three times as long and has a duration three thousand to more than four thousand times that of one of the permissible explosives, also the rate of explosion is slower.

(b) The permissible explosives are one and one-fourth to one and three-fourths times as strong, and are said, if properly used, to do twice the work of black powder in bringing down coal; hence only half the quantity need be used.

(c) With 1 pound of a permissible explosive or 2 pounds of black powder, the quantity of noxious gases

given off from a shot averages approximately the same, the quantity from the black powder being less than from some of the permissible explosives and slightly greater than from others. The time elapsing after firing before the miner returns to the working face or fires another shot should not be less for permissible explosives than for black powder.

The use of permissible explosives should be considered as supplemental to and not as a substitute for other safety precautions in mines where gas or inflammable coal dust is present under conditions indicative of danger. As stated above, they should be used with strong detonators; and the charge used in practice should not exceed  $1\frac{1}{2}$  pounds, and in many cases need not exceed 1 pound.

Inasmuch as no explosive manufactured for use in mining is flameless, and as no such explosive is entirely safe under all the variable mining conditions, the use of the terms "flameless" and "safety" as applied to explosives is likely to be misunderstood, may endanger human life, and should be discouraged.

JOSEPH A. HOLMES,

Expert in Charge Technologic Branch.

Approved, May 18, 1909:

Geo. Otis Smith, Director.

#### ERNEST LEIGH FRALECK.

Ernest Leigh Fraleck died at Cobalt on Friday, May 27, 1909. Mr. Fraleck was recovering from an attack of typhoid fever. Death came unexpectedly.

E. L. Fraleck was born in Belleville, Ont., thirty-four years ago. His early education was acquired there. At an early age he entered Queen's University as an Arts student. After securing his B.A., he took a mining course in the Kingston School of Mining. Throughout his university career he was one of the outstanding figures in college politics. If I remember aright, "E. L." was never elected to office in the Alma Mater Society—an organization that governs the whole body of students—mainly because he was an out-and-out radical. But, whatever may have been his relation to college affairs generally, "E. L." had always a band of retainers who followed him implicitly.

I can recall, with absolute clearness, several occasions on which Fraleck spoke at Alma Mater gatherings. Frequently these meetings were stormy. Often a surprising amount of feeling was displayed by the speakers. I cannot remember one instance in which Fraleck either lost his head or made a false move. He was calm, forceful, and deliberate in his speech. It appeared to matter little to him if he lost an election. He always fought for some principle. Indeed he was essentially a fighter, and a constructive, clear-headed debater.

Fraleck's detached manner and his judicial attitude towards questions of the hour were apt to give the impression that his was a phlegmatic temperament. Such was by no means the case. Fraleck, as his professional work showed, was a man capable of profound and disinterested enthusiasm. His record in Cobalt is eloquent proof of this.

Because his strong character and vigorous mind were but beginning to be recognized more widely, and because his friends believe that a large sphere of usefulness lay before him, there is little necessity of detailing minutely the events in Fraleck's professional life. One paragraph will suffice.



After taking his mining course at the School of Mining, Kingston, he accepted a position as superintendent of a pyrite mine at Queensboro, North Hastings, Ont. While holding this post he followed and advised upon the development of other neighbouring properties. Later he joined the staff of the Ontario Bureau of Mines, and acquired an intimate knowledge of many of the mining districts of the Province. Early in the



ERNEST LEIGH FRALECK.

year 1907 he was appointed superintendent of the Cobalt Lake mine, Cobalt, Ont. This position he occupied until the day of his death.

Of Fraleek's efficiency as a mine manager there is no room for doubt. His work was neither erratic nor spectacular. It was carefully planned, thoroughly executed, and led always to definite results. His influence with the directors of his company was large. This influ-

ence he exercised wholesomely. The problems that confronted him in the development of the Cobalt Lake mine were intricate. The peculiar financial conditions under which the company had been organized did not make these problems easier. But Fraleek cheerfully met every difficulty, moulding and carrying out a wise policy of development, a policy that had absolutely no reference to the stock market.

In the last two years Fraleek was fast becoming a strong factor in Cobalt affairs. An earnest and whole-hearted citizen, he never spared himself in his efforts to rectify wrongs. On all matters of civic interest he was exceedingly well informed and constantly active.

But it was in his capacity as a member of the Canadian Mining Institute that Fraleek was best known. At the recent annual meeting he took a prominent part in the more important discussions. He was easily among the most effective speakers.

Recognition from his professional brethren came rapidly after his arrival in Cobalt. This year he was elected a member of the Council of the Canadian Mining Institute. The office of President of the Cobalt Mine Managers' Association he accepted and filled most efficiently. His advice and assistance were never denied to any worthy cause.

I think that it can be said of Fraleek that he was a sane, courageous, clear-headed Canadian. In any profession he would have won distinction. In the profession of mining engineering, a profession in which distinction is particularly hard to gain, Fraleek had already emerged from the rank and file. I am convinced that he would have accomplished great things had his life been spared.

Fraleek is dead. Many of his more intimate friends will never forget him, for he himself was a loyal and true friend. The Institute has reason to keep his memory green, for he laboured in season and out of season to aid and strengthen it.

To his bereaved family I believe a large measure of comfort must lie in the fact that Fraleek held and deserved the steadfast respect of his many acquaintances, and the abiding affection of his friends and associates.

J. C. MURRAY.

## MINERAL DEPOSITS OF THE SERPENTINE BELT OF SOUTHERN QUEBEC.

By John A. Dresser, McGill University, Montreal.

(Continued from last issue)

### IV. Chromite.

Chromic iron, valuable not for its iron but for its content of chromic oxide, occurs very generally in the peridotite and the serpentine of the Thetford, Black Lake and Danville type. The chief production is as yet from the Counties of Megantic and Wolfe, the former producing much the greater amount.

The placing of the industry on a substantial commercial basis has been largely due to the vigorous operations of the Black Lake Chrome and Asbestos Company, who are as yet the principal producers.

1. Production.—As early as 1861 samples of some tons' weight were shipped from Ham, in the County of Wolfe, to London and Glasgow, but no mining resulted, probably owing to the undeveloped state of the country, as the price of chromite was at that time four or five times higher than at present. In 1886 and 1887 another attempt was made to exploit the chromite ores of Quebec by Dr. James Reed, who shipped 100 tons from Wolfestown, Leeds and Thetford to Philadelphia. No further shipments seem to have been made until 1894, when operations were begun at several points, and

1,000 tons of ore were shipped. The returns of the Geological Survey record a production since that date valued at over \$600,000. The output of the last six years is as follows:—

| Production.          | Value.   |
|----------------------|----------|
| 1903—3,500 tons..... | \$51,121 |
| 1904—6,074 “.....    | 67,146   |
| 1905—8,528 “.....    | 104,565  |
| 1906—8,750 “.....    | 92,100   |
| 1907—7,196 “.....    | 72,091   |
| 1908—7,225 “.....    | 82,008   |

Canada, the total production of which is from this district, stands fourth among the countries of the world in the production of chromic iron, and furnishes about 10 per cent. of the world's output. The three leading countries are:—

|                     |             |
|---------------------|-------------|
| New Caledonia ..... | 51,000 tons |
| Russia .....        | 20,000 “    |
| Greece .....        | 15,000 “    |

of chromite are frequently scattered through all parts of these rocks. The general dissemination of ore throughout the rock, together with the highly altered and disturbed condition of the latter, would suggest that the ore bodies have been formed by concentration of ore from the surrounding rock, but detailed examination does not support this view.

The walls of the ore bodies are not usually well defined, and grains of chromite are quite as plentifully disseminated in the wall rock near the ore bodies as elsewhere. The deposits are irregular in shape, though they commonly have an approach to ellipsoidal outlines in a surface section, indicating that they are more or less lens-shaped. The longer axes lie parallel to the lines of fracture or cleavage in the country rock, that is, in a northeast and southwest direction, and so the form may be due to regional pressure which has been exerted on the ore bodies since they were formed. The majority of the ore bodies yet found are near, but rarely at, the contact of the serpentine, or peridotite



Fig. VI.—Photomicrograph of Chromite Ore.

Turkey, the United States and New South Wales produce smaller amounts. Turkey is reported to have large deposits of a good quality of ore, but the lack of railway or water transportation makes mining practically prohibitive at present prices.

A limited quantity of the Canadian ore has been used by the Electric Reduction Company of Buckingham, Quebec, in the manufacture of ferro-chrome. The remainder, except for occasional shipments to Europe, is shipped to the United States. It is there used for the manufacture of bichromates for use in dyeing textiles, tanning leather, for pigments in printing and painting; in making chrome steel; and lower grades for furnace linings.

2. Distribution of the Deposits.—The ore is found in the serpentine and peridotite, in some parts in large bodies of ore, in others, in mere nodules, while grains

with adjacent rocks, and none of importance are far from the contact. There appears to be no definite order in the distribution of the ore bodies, they being separated by bands of the country rock from a few inches to many feet in thickness.

3. Origin of the Ore Bodies.—These observations seem to indicate that these ores have originated by primary segregation from the peridotite magma, as was first suggested by Dr. F. D. Adams in a paper presented to the Province of Quebec Mining Association in 1894 (“On the Igneous Origin of Certain Ores”—Trans. Prov. Que. Mining Association, Montreal, 1894). A similar origin has since been established for the chromite ores of the Eastern United States by J. H. Pratt (Trans. A.I.M.E., 1899), while J. H. L. Vogt (Zeitschrift für Praktische Geologie, Oct., 1894) had pre-



only shown the chromite of Hestmandø, Norway, to be due to primary segregation.

4. Character of the Ore.—Chromic iron consists theoretically of an equal number of molecules of chromic and ferrous oxide, answering to the formula  $\text{FeO}$ ,  $\text{Cr}_2\text{O}_3$ , but ore of such purity has not been found in nature except in meteorites. Alumina and magnesia seem to be invariably present, replacing the  $\text{Cr}_2\text{O}_3$  and the  $\text{FeO}$  in varying proportions. Following are two analyses by T. Sterry Hunt of specimens regarded by him as typical of the Quebec deposits. (Geology of Canada, 1863, p. 479.) They are from the Township of Bolton, in the County of Brome, a locality which, although it has not yet produced ore on a commercial basis, seems likely to do so with proper development. Two analyses of chromite, one from Turkey, the other from New Caledonia, are also given for comparison:—

|                               |       |        |       |       |
|-------------------------------|-------|--------|-------|-------|
| $\text{Cr}_2\text{O}_3$ ..... | 45.90 | 49.75  | 51.70 | 55.70 |
| $\text{Al}_2\text{O}_3$ ..... | 3.20  | 11.30  | 14.10 | 16.20 |
| $\text{FeO}$ .....            | 35.38 | 21.28  | 14.20 | 16.20 |
| $\text{MgO}$ .....            | 15.03 | 18.13  | 14.30 | 9.80  |
|                               | 99.51 | 100.46 |       |       |

While the higher magnesia accompanies the lower percentage of iron, as would be expected in a simple replacement of the latter by the former, the higher alumina accompanies the higher chromic oxide. Hence the molecular combinations are more complex than might at first appear.

In discussing the ores of the Eastern United States, Mr. Pratt (op. cit.) has suggested that chromite is an isomorphous mixture of three distinct molecules,  $\text{FeO}$ ,  $\text{Cr}_2\text{O}_3$ ;  $\text{MgO}$ ,  $\text{Cr}_2\text{O}_3$ ; and  $\text{MgO}$ ,  $\text{Al}_2\text{O}_3$ . This hypothesis seems both necessary and sufficient to explain the variations in composition that are found in these ores.

In microscopic sections of ore from Black Lake the chromite is found to consist of two parts—a reddish-brown, translucent substance, and a black, opaque material (Fig. 6). Separations of these, which were effected by means of the Wetherill magnetic, and an hydraulic separator with ascending current, showed on analysis of the products a higher percentage of  $\text{Cr}_2\text{O}_3$  and  $\text{FeO}$  in the black portion than in the reddish part. Further investigation is being made by the writer on these, and on ores from other parts of the world.

The price of chromite is based on a standard of 50 per cent. chromic oxide, lower grades being penalized and those of higher quality being at a premium. Ores carrying less than 40 per cent. and as much as 10 per cent. are concentrated to 50 per cent., or a little higher. The first-class crude ores, or concentrates, rarely exceed 55 per cent., while theoretically pure chromite of the formula  $\text{FeO}$ ,  $\text{Cr}_2\text{O}_3$  should yield 68 per cent. The difference is evidently due not to defective ore dressing, but to the composition of the ore, which in Southern Quebec seems unlikely to be found to contain much above 55 per cent. of chromic oxide. As the analysis given above shows, ore from New Caledonia may have a somewhat higher percentage of  $\text{Cr}_2\text{O}_3$ , but is, as might be expected, lower in magnesia. While these features may make the New Caledonia ore more desirable for the bichromate industry, the higher magnesia probably favors the Quebec ores for use in the manufacture of alloys of steel.

#### V. Talc.

Talc and soapstone are practically undeveloped resources of the serpentine belt. Many portions of the intrusive rock, being originally rich in pyroxene, have

altered to steatite or soapstone, and frequently to a purer variety of talc. These are found principally in connection with the older serpentine of the Broughton series. On Lot 2, Craig's Road Range, of the Township of Ireland, in the County of Megantic, there is apparently a large deposit of talc of excellent quality. Unfortunately for the development of the property a little copper ore was found on it, and the prospectors' attention was turned from opening a promising talc deposit to selling a copper "mine." The property is eleven miles from the Quebec Central Railway at Black Lake.

Within one or two miles of the Quebec Central Railway, between Robertson and Broughton stations, there are several small hills of soapstone, some of which probably reach the quality of talc.

Several soapstone quarries have been opened at various times, chiefly for local use, in many parts of the serpentine belt, but no steady industry has as yet resulted.

From the Township of Potton, Brome County, a specimen of soapstone was taken which gave the following results in an analysis by T. Sterry Hunt:—

|                      | Potton | Pure Talc<br>(Theoretical Composition)                        |
|----------------------|--------|---------------------------------------------------------------|
| $\text{SiO}_2$ ..... | 59.60  | 62.8                                                          |
| $\text{MgO}$ .....   | 29.15  | 33.5                                                          |
| $\text{FeO}$ .....   | 4.50   | Usually contains a<br>little iron replacing<br>$\text{MgO}$ . |

A comparison with the composition of the theoretically pure talc, as cited here, indicates a comparatively high grade for the Potton deposits.

#### VI. Copper.

Copper occurs in three classes of deposits in the Eastern Townships of Quebec:—

1. In the limestones where they are invaded by dykes of igneous rock, as at Acton.
2. In a volcanic series—the porphyries and andesites of Capelon and Harvey Hill.
3. In the diabase of the serpentine series.

It is with this last only that this paper is concerned. These ores occur in pyrrhotite, while those of the Capelon and Harvey Hill series are in pyrite. In both cases the ore is chalcopyrite, and seems to have been introduced later than the pyrite or pyrrhotite bodies that contain them.

The largest of these bodies of copper have been found in the County of Brome, especially in the Townships of Potton and Bolton. The best known is the once famous Huntingdon mine in Lot 8, Range VIII of Bolton, which was vigorously operated between 1865 and 1873, while some work has been done more recently. During this period it is reported to have yielded from 200 to 400 tons per month of ore carrying between 7 and 10 per cent. of copper. The principal ore body lies in the diabase along its contact with Ordovician slates through which it is intruded. The width of the deposit mined is from eight to fourteen feet. Two miles north of the Huntingdon, on Lot 2, Range IX, of Bolton, is the Ives mine, which was worked for upwards of ten years. Similar ore bodies have been disclosed by smaller workings between these properties and to the north and the south of them. At the time of working the nearest railway was some twenty-four miles distant, but within the past three years the Orford Mountain Railway has been extended so as to pass in the immediate vicinity of these properties, all of which lie in the valley of the Missisquoi River.



Also in the same vicinity and within a little more than a mile from the railway is the Lake Memphremagog mine, on Lot 28, Range IX, of Potton. This property is on the west slope of Hog's Back Mountain, a diabase hill on the west shore of Lake Memphremagog. The ore is chalcopyrite and pyrrhotite, and probably ranges from 1 to 9 per cent. copper, with about 35 to 40 per cent. iron, and nearly the same amount of sulphur. After a period of disuse, this property is now being equipped with plant, and will soon again be worked. It is doubtless one of the largest ore bodies in the district.

A deposit of somewhat similar character is found to the northeast of the last in Garthby, near Lac Coulombre, in the County of Wolfe. The ore body here is so covered that its full extent could not be seen, but it is evidently of important size. In the interval of forty-five miles between this and the Lake Memphremagog deposits, several occurrences of similar ore are known. Probably the most important are in the Townships of Orford and Brompton, in the Counties of Sherbrooke and Richmond.

At a distance of one hundred miles northeast of Garthby, blocks of diabase carrying pyrrhotite and chalcopyrite were recently found in the Counties of Montmagny and L'Islet. Here the rocks of the serpentine belt occupy some twenty square miles of country, generally wooded, and in which probably no prospecting has ever been done. It is near the line of the projected extension of the Quebec Central Railway from St. George de Beauce to Temiscouata.

#### VII. Antimony.

Antimony is found in the diabase of the serpentine belt on Lot 28 of the first range of South Ham, Wolfe County. It was discovered here in 1863, and has been worked at two periods since that time, first by Mr. W. Russell, of Quebec, and later by the present owner, Dr. James Reed. No statistics of production are available. Two shafts have been sunk, one to a depth of one hundred feet, the bottom of which is reached by an adit some three hundred feet in length. At present no work is being done.

The ore consists of native antimony, valentite or oxide of antimony, and a little kermesite, the oxysulphide. It occurs in small veins, the largest about a foot wide, near the contact of diabase with sedimentary slates.

#### VIII. Nickel.

Nickel was mined for a time about 1882 on the sixth lot of Range XII., of Orford, in the County of Sherbrooke, by the well-known Orford Nickel Company, which was organized to operate the property. No records of these operations are available, but the quantity of ore was probably insufficient to make the work successful. Millerite, the sulphide of nickel, occurs here in calcite, but I have not been able to learn whether any other ore of nickel was obtained or not. The locality is now important chiefly for its excellent mineralogical specimens—millerite, ouvarovite and pyroxene—which are to be found in collections in many parts of the world.

#### Conclusion.

There is little detailed information available regarding the serpentine belt in the Shickshock Mountains. The explorations of Dr. A. P. Low and Dr. R. W. Ells, as well as of the earlier geologists of the Geological Survey of Canada, have shown that there is a large

development of these rocks. Considerable prospecting for asbestos has probably since been done, but thus far, without success. From such information as is available, the district seems likely to contain chromic iron at least, and prospecting for other minerals may yet be attended with success.

Platinum was found in the gravels of the Chaudiere valley many years ago by Sir William Logan. The natural habitat of that mineral is in the peridotites and serpentines, but it has not yet been traced to its source.

As these imperfect notes will have shown, the present knowledge of this complex series of rocks and the minerals they contain is very incomplete. Much remains to be learned and applied before the mineral resources of this area can be developed to the limit of their capacity. It is hoped that enough has been said to show that the serpentine belt is a factor of much present importance and of still greater prospective value to the commercial life of the Dominion.

#### FIELD WORK, GEOLOGICAL SURVEY, 1909.

The allotment of field parties, so far arranged for, is as follows:—

Mr. D. D. Cairnes will have a party in the Wheaton-Watson Rivers region in Southwestern Yukon.

Mr. R. G. McConnell will complete his examination of the geology and mineral resources of Texada Island.

Mr. F. H. McLaren will finish his topographic map of Texada Island.

Mr. W. W. Leach is engaged in mapping in the vicinity of Hazelton, Skeena River, and will examine in detail the coal area near Telkwa, discovered by him last season.

Mr. C. H. Clapp will continue his geological investigations on Vancouver Island.

Mr. R. H. Chapman will begin a topographical survey of Vancouver Island.

Mr. W. Sutton will report on the coal rocks of the east coast of Vancouver Island.

Mr. Charles Camsell will continue work in the Similkameen district, more particularly the Tulameer River district.

Mr. L. Reinecke will complete the topographical map of the Tulameen and begin a survey of the west fork of the Kettle River.

Mr. George Malloch will make a geological survey of the Fort George region on the Grand Trunk Pacific.

Mr. O. E. LeRoy will study the geology and ore deposits of the Slocan. He is now completing a geological map of the Sheep Creek mining camp.

Mr. W. H. Boyd will make a topographical map of the Slocan.

Mr. S. J. Schofield will be employed in mapping in the East Kootenay district.

Mr. John Macoun is continuing his natural history collecting in the west.

Mr. D. B. Dowling will investigate the coal lands of Alberta west of Edmonton.

Mr. W. McInnes will continue his geological investigations in the district north of Edmonton.

Mr. W. H. Collins is continuing his examination of the Gowganda district.

Mr. W. A. Johnston will resume his mapping of the Lake Simcoe region.

Mr. M. E. Wilson will be working north of Lake Temiskaming.

Mr. G. A. Young will continue his work in the Bathurst district, New Brunswick.



Mr. J. A. Dresser will continue his investigations on the rocks and economic minerals of the Eastern Townships.

Dr. R. W. Ells will complete his investigations of the oil shales of New Brunswick, and examine the shales of Nova Scotia and Gaspe.

Mr. E. R. Faribault will continue mapping the gold-bearing rocks of Nova Scotia.

Mr. H. Fletcher's field season will be spent on the coal formation of Cumberland County.

Mr. H. Ries, accompanied by Mr. Joseph Keele, will begin a study of the clays of the Dominion. The Maritime Provinces will be examined this season.

### PLATINUM CONSUMPTION.

England, United States, France, and Germany are the four chief consumers of platinum. The total annual consumption is about 366,000 ounces. One-third of this is scrap platinum, which, every year comes regularly into the market. Russian platinum production is between 200,000 and 300,000 ounces crude. Other producers are Sumatra and Borneo, Colombia, United States, and New South Wales. It is calculated that about 61 per cent. of the world consumption of crude platinum finds its way to the market secretly. This is being graded with a vengeance. To prevent this in

Russia it has been proposed that the export of crude platinum from Russia shall be absolutely prohibited. A special Commission is to fix every year in advance the quantities and the prices for the platinum to be sold abroad.

Nickel having come into extensive use in the kitchen, it is important to know what action food substances have on it, and how its compounds may affect a person eating food containing them. Late Russian experiments are reassuring on both points. Substances boiled in nickel vessels took up a small quantity of the metal—from 0.0002 with some foods to as much as 2 per cent. when the acid present is excessive; but a solution containing 4 per cent. of citric acid and 5 per cent. of common salt had only 0.144 per cent. of nickel after boiling three hours in a nickel vessel and then standing 11 hours in the same vessel. The physiological effects of nickel salts were slight, while there was no tendency to accumulate in the body after repeated doses. Nickel in quantities up to a quarter of a gram daily, in the form of lactate or butyrate, was given to two dogs for 202 days, with no result; and a dog that died after taking 9.7 grams (about a third of an ounce) in 40 days had no nickel in its body, its death having been due to some other cause. Doses as large as 1 to 2 grams daily were necessary to give any symptoms of poisoning.

## GOWGANDA MINING DIVISION, DISTRICT OF NIPISSING, ONTARIO.

Notes from Preliminary Report by W. H. Collins, Geological Survey of Canada.

### Location and Area.

The portion of the Montreal River region with which the present report deals lies in the extreme western part of the District of Nipissing, in the neighbourhood of N. Lat. 47.45, and about 85 miles north of the town of Sudbury. It includes an area of 350 square miles, most of which lies between the two large branches of the Montreal River, which empties into Lake Temiskaming on the west side.

### Means of Access.

In 1908 the most used route to the Montreal River district started from Latchford, a station on the Temiskaming and Northern Ontario Railway, 93 miles north of North Bay. From this village, situated on the Montreal River, a line of small steamers made daily trips up the river for 56 miles to Elk Lake. This up-river terminus was then a rapidly growing village. In the spring of 1907 it consisted of a single shack and a cluster of prospectors' tents; when seen in October, 1908, it had a population of over 200 people and all the conveniences of a village of that size, including a post-office with regular mail service, a mining recorder's office, lately removed from Latchford, general stores, hotels, etc.

From this point, which forms the headquarters and point of departure for Montreal River prospecting parties, a variety of routes lead westward. The Montreal River may be ascended to the Forks, where its two branches unite, but the stream is rapid, and, especially at high water, difficult of ascent, besides offering a very indirect route to the most frequented districts. The Bloom Lake route, a map of which accompanies the

Report of the Bureau of Mines, Ontario, 1907, was, during 1908, very commonly used. This route, nine miles in length and consisting of a chain of small lakes and portages, leads, from a point on the main river 11 miles above Elk Lake, directly west to the East branch. From the East branch many courses are open. Both East and West branches are easily navigable. Good portages exist at all these places, so that travel either up or down stream presents no difficulty. Numerous good canoe routes connect the two branches and Duncan and Pigeon Lakes, and allow of easy access to the country in the west.

### General Geology—Outline of Geological History.

Though the geology of the region presents considerable complexity of detail, the general historical facts are distinct and go to show that the whole complex of formations and systems is capable of separation into four major divisions widely different from one another. The mutual relationships of these divisions, a knowledge of which is essential to a thorough comprehension of the geology, are succinctly expressed by the accompanying diagram.

The oldest division, the Keewatin, comprises a complex association of metamorphosed rocks, principally eruptive, characterized by well-developed, secondary schistosity and prevalently dark colours. They dip at angles approaching 90 degrees, and range in texture from soft, fissile, chlorite schists to fine-grained gneisses or altered diabases. In the Montreal River district the Keewatin areas are not entirely visible, being overlain by other rocks, but they are thought to represent the bottoms of trough-like folds, produced by the upward



intrusion of igneous matter which now constitutes the Laurentian. The latter forms the second division, its origin being apparent from the foregoing statement. It is wholly igneous, consisting of granite and allied coarsely crystalline rocks essentially pale-coloured owing to their richness in quartz and feldspar. Gneissic structure has been developed in varying degrees, so that all gradations between granite and gneisses exist; but it never attains the perfection found in the Keewatin. Near their contacts with the Keewatin, the gneisses are apt to contain dark bands and ribbons of the latter so highly crystalline as to conceal their identity.

Wherever visible the surface of the Keewatin and Laurentian presents an irregular, deeply worn appearance, the result of extremely protracted exposure to erosive agencies. To the best of geological knowledge the same conditions hold where they lie buried under the Huronian, indicating that a great period of denudation separates the latter from the Archaean. The combined Keewatin and Laurentian, or Archaean system, is therefore to be conceived as forming at all points in the district an ancient denuded foundation or floor upon which rests the much younger Huronian system.

This third division is, in the Montreal River district,

Archaean and Huronian, but is ordinarily distinguishable by its unusual freshness, dark colour, and crystalline appearance. In certain cases, to be described subsequently, it may be confused with certain other diabases. Magmatic differentiative processes have evolved diabase types of very dissimilar appearance and mineralogical composition, of which a pink aplite occurring in dike form is the most extreme. Olivine diabase dikes are also present in the region, but in far less abundance.

Of little importance are the sands and gravels of glacial origin which lie thinly in the depressions and lower lands of the present plaiated surface.

#### Table of Formations.

The geological events may be briefly enumerated in ascending order as follows:—

Deposits of glacial debris and weathering products of present surface.

Erosive period with glaciation.

Diabase intrusions.

Huronian sedimentation.

Erosion period.

Laurentian intrusion.

Keewatin.

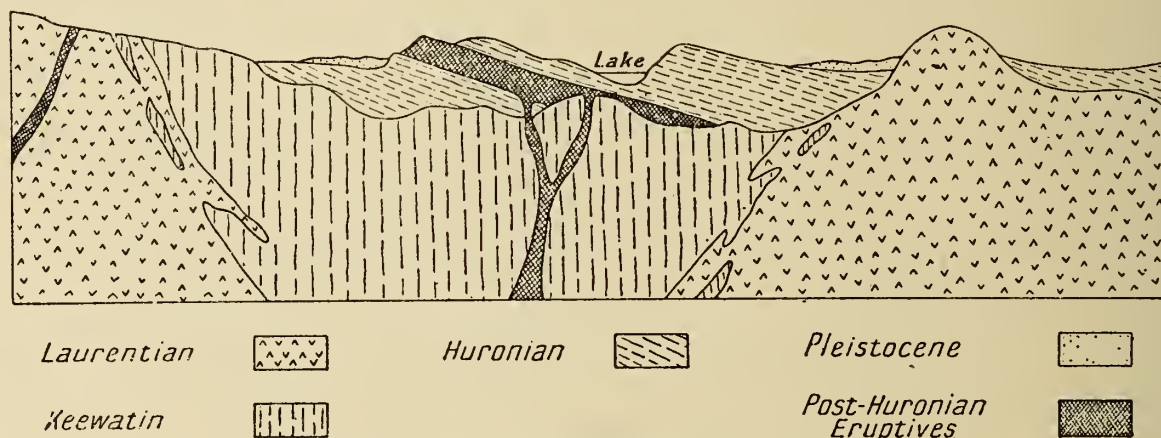


Diagram Illustrating Geological Relationships of Montreal River District.

wholly sedimentary and easily distinguished from the other rocks by its bedded structure and clastic nature. As it is the only sedimentary system represented, its members are not easily confused with any other, especially as their original structure is not obscured by metamorphic alteration. Locally this is not strictly true; in the vicinity of diabase intrusions they have been hardened and shattered so as to simulate the Keewatin, but the zones of alteration are narrow and readily identified by their gradation into adjacent areas of less altered types. At present the Huronian forms a discontinuous rock mantle over the Archaean, formerly more complete, but now worn through in places so as to expose portions of the crystalline basement.

The fourth division includes all eruptives known to be younger than the Huronian. Owing to the discontinuity of the latter it is not always easy to decide what rocks should be included in this group, for in some cases rather fresh-looking eruptives occur in the Keewatin which probably would also intrude the Huronian were it present; lacking the necessary information their chronological position can be only loosely fixed. By far the most extensive and important of the post-Huronian eruptives is the diabase with which the silver deposits are associated. This penetrates both

#### Economic Geology—Silver—Distribution.

With the knowledge acquired from exploitation of James Township, and other of the more recently discovered silver-cobalt camps, prospectors in the Montreal River district gave exclusive attention to the diabase formation, recognizing it to be closely connected with mineralizations of this kind. Some work was done in 1907, and more in the following season, with the result that on August 4 the first native silver discoveries were made, almost simultaneously and at short distances apart, by Messrs. Mann and Dobie, in the diabase just west of Gowganda Lake. The remarkable rich surface showings at once attracted the attention of the whole prospecting body in the Elk Lake country, and an activity began which, since the spreading of information to outside points, has developed into a "rush" of large dimensions.

The known silver bearing area is restricted as yet to about ten square miles lying between Gowganda Lake and the portage route from Elkhorn to Firt Lakes, and is commonly known as Gowganda. Extensive prospecting only commenced in September, about the close of the field season, so that only the earlier discoveries are known to the writer, and a knowledge of



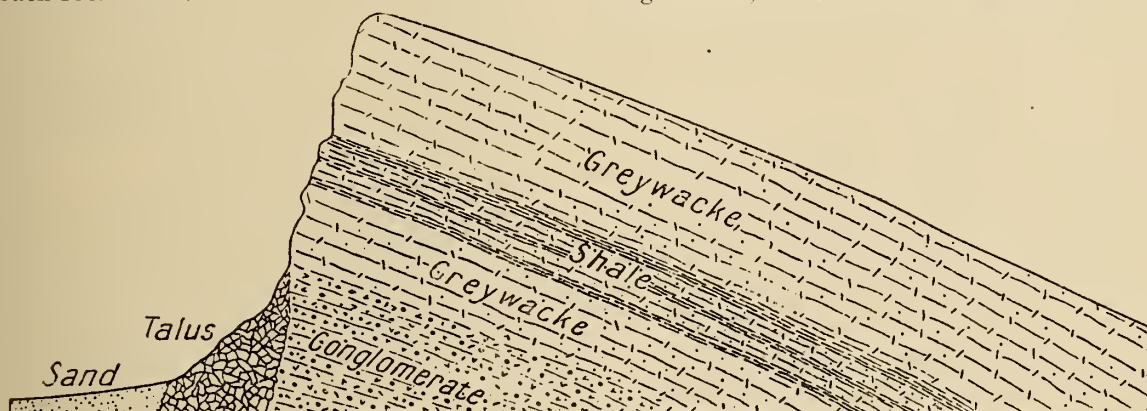
the surface details could only be derived by examination of the few beginnings of patient and continued exploration by claim owners. The present account must accordingly be accepted as incomplete and by no means representing the present status of the Gowganda camp.

### Surface Indications.

Conditions in the region are such as to demand exploration of the closest and most intensive order, for the indications of mineralization are negative rather than positive in character. The Gowganda area was entirely forested at the beginning of 1908, and a carpet of moss and vegetable mould covered most of the rock surface. Glacial materials are also fairly abundant, and sometimes thick enough to render surface exploration arduous and expensive. Added to this the veins are eroded more deeply than the country rock, and are represented at the surface by crevices filled with soil, and thereby rendered inconspicuous. Were the country a flat one the difficulties in the way of successful prospecting would be very serious, but fortunately it is rugged, especially near the diabase. Steep ridges of this material are a regular topographical feature. The sides of these ridges are bare or readily exposed, and offer fine opportunities for examination. It is significant that the first silver discoveries were made in the sides of such rock walls.

ture, though not of mineralization, is found to obtain. The whole mineral association is not found in any one vein, nor are the relative proportions either of ore or gangue at all constant. The gangue minerals are quartz and calcite, always mutually arranged in a definite manner. The sides of the veins are composed of white quartz, which may form only an insignificant coating on the walls or may occupy nearly the whole space, but in all cases there remains a central cavity into which the pointed ends of quartz crystals project freely. At the surface this central portion is empty owing to weathering, but farther down it is filled by calcite. Veins with predominant quartz filling seem especially abundant in the Huronian adjacent to the diabase. The rich veins near Gowganda, so far as ascertainable, are poor in quartz.

Practically all of them carry chalcopyrite either as diffuse grains or in considerable amounts. Pyrite is equally abundant, but less constant. Galena is not uncommon. All these occur with the quartz; their presence in the calcite is not certainly known. Many of the veins show diffuse stains of reddish pink colour due to cobalt bloom, which, though not in itself of value, is important as a sign of the existence of smaltite, from which it is formed by oxidation. The minerals enumerated thus far are widespread, but economically insignificant; the silver-cobalt association is present in



Vertical Section Across Huron Ridge, North of Duncan Lake.

### Structure of Veins.

The deposits are in the form of well-defined veins occupying fissures in the diabase. The amount of surface work done in September was not enough to throw much light on the continuity of the veins, but a few had been traced for distances of 300 or 400 feet, and in one case across several contiguous mining claims, so that they may be said to occupy persistent fissures. They vary in width from 1 inch up to 20 inches. Little could be learned concerning their attitudes, except where they traverse hillsides; in such cases they are approximately vertical. It is not yet known whether any regularity exists in their arrangement, but some extend east and west, while others are north and south. The diabase shows no signs of extensive deformation, all geological evidence indicating that since its solidification its history has been uneventful, yet the cracks which the veins occupy appear too persistent to be the result of contraction by cooling. Besides the strong veins there are others of the gash type, but the latter are small, not very continuous, and poorly or not at all mineralized.

### Composition of Veins.

From comparison of veins at Gowganda, Duncan Lake, and Wapus Creek a general uniformity of structure,

some cases, however. Little opportunity existed in 1908 for favourable study of these minerals, so that only a list of those found at the surface can be given. There native silver, argentite, smaltite and cobalt bloom have been found, and a few feet down small lumps of native bismuth. Because they occur either in calcite or in loose decomposition materials filling the space which the calcite formerly occupied they are believed to be associated with that gangue. Infrequently gangue minerals are almost absent and the vein filled by massive ore.

(To be continued.)

Fraser & Chalmers recently gave an exhibition of a new form of tube mill. The new mill, while similar in most respects to the ordinary type, differs in one important feature. An eccentric motion is imparted by attaching the tube to the trunnions off centre. Greater activity is thus transmitted to the pebbles. The degree of eccentricity that will prove most efficient has yet to be determined.



# THE BULKLEY VALLEY AND VICINITY.

W. W. Leach.

(From Summary Report of the Geological Survey, 1908.)

During the past season the work undertaken in this district was chiefly in the upper parts of the valleys of the Morice and Zymoetz (Copper) rivers, though some time was spent in collecting sufficient geological and topographical information for the compilation of a new and enlarged edition of the map published last spring.

## Morice River District.

As the season was exceptionally late, it was found necessary to spend the earlier part of it in the lower levels; the valley of Clarks fork of the Morice being the first point to be visited. This stream rises with the south fork of the Telkwa, near Howson camp, in a wide, flat pass with an elevation of about 3,600 feet, thence its course is nearly due south for a distance of about 20 miles, when it unites with the main Morice River. Its chief tributaries are Starr Creek, Goldstream, Gabriel Creek, and a large unnamed creek coming in from the east a few miles below Gabriel Creek. From the mouth of Gabriel Creek down, the valley is wide, the hills on either side being comparatively low, with gentle slopes, while the grade of the stream itself is not great.

## Geology.

From the pass southward to about one-half mile below the mouth of Gabriel Creek the rocks met with consist of the volcanics of the Porphyrite group (underlying the coal-bearing beds), except for a short distance midway between Starr Creek and Goldstream, where the basal conglomerate of the coal series crops. It appears, however, that here the coal seams have been almost entirely eroded.

A short distance below Gabriel Creek the conglomerates again outcrop on the west side of the river, for a distance of at least eight miles, that being as far south as the valley was explored. Along this stretch the river follows pretty closely the strike of the rocks, near, but usually a little west of a synclinal axis. On the west side the dip of the strata is very low, conforming more or less to the slope of the hills. Practically the whole of the coal measures above the conglomerates has been lost by erosion. On the east side of the valley, however, the hills have a steeper slope; the dips are quite low and the synclinal axis is roughly parallel to, and some distance to the east of, the river bottom. Taking these facts into consideration, it was thought probable that an important coal basin might be found on the east side of the valley. Some days were spent, therefore, in carefully examining a number of small creeks on the east side, with the result that the conglomerates were found outcropping at from one to one and a half miles back from the river, at elevations varying from 400 to 600 feet above it, and with westerly dips. The conglomerate here appears to reach a much greater thickness than where observed elsewhere in this country. Two distinct beds were noted, the lower about 100 feet thick, and the upper probably 30 or 40; they are separated by about 50 feet of soft sandstone. On a small creek, about one mile below Gabriel Creek, and about one mile from the river, the coal-bearing shales were seen overlying the conglomerates. Two coal seams were here found, the lower one show-

ing 3 feet of coal, with no roof, while the upper one gave the following section:—

Clean coal, 12 inches.

Shale, 4 inches.

Coal, 3 feet 6 inches.

Later on in the season this point was again visited when it was found that during the interim Messrs. C. B. Clark and T. Howson had done considerable prospecting in the vicinity, and staked a number of coal claims. They had opened up what is undoubtedly the upper of the above-mentioned seams, at several points, showing it to be about ten feet thick and dipping to the west at thirty degrees. At none of these openings had they reached below the level of the surface waters, the coal in all cases being wet and decomposed, so that a sample taken at that time would hardly give a fair idea of the character of the coal. The seam, however, appeared to be quite regular, except at one point where a slight local disturbance was noted.

The following analysis from a sample taken under the conditions already mentioned. It can be confidently expected that the percentage of moisture, and probably of ash, will be materially reduced in a sample taken under more favourable circumstances:—

|                                       |       |
|---------------------------------------|-------|
| Moisture . . . . .                    | 10.81 |
| Volatile combustible matter . . . . . | 31.22 |
| Fixed carbon . . . . .                | 48.62 |
| Ash . . . . .                         | 9.35  |

Coke: non-coherent.

This area appears to be one of the largest in a district where the coal beds occur, as a rule, in small basins. Although the seams were opened up at one point only, still there is little doubt that this basin extends down to the forks of the Morice, and probably widens out below the place where the seams were stripped, at which point it is approximately three-quarters of a mile in width.

The general attitude of the strata is quite regular, the valley is wide, with an easy grade, and no serious engineering difficulties need be looked for in the construction of a branch line of railway down the Morice River, to connect with the main line of the Grand Trunk Pacific. There is a plentiful supply of timber in the valley for all future mining purposes.

## Goldstream Coal.

On Goldstream, to the north-west of this area and separated from it by a short distance only, another important coal basin is found, which was briefly described in last year's Summary. Since then, however, the locator, Mr. F. M. Dockrill, has opened up the seams at several new points, which proves this basin to be at least as large, and probably larger than it was estimated to be last year, viz., two by two and one-half miles.

The following results are from analyses made of samples taken this season:—

|                           | Moisture. | Vol. Comb. Matter. | Fixed Carbon. | Ash |
|---------------------------|-----------|--------------------|---------------|-----|
| (1) 8 ft. seam . . . . .  | 4.67      | 30.55              | 55.23         | 9.5 |
| (2) 6½ ft. seam . . . . . | 6.36      | 28.36              | 58.75         | 6.5 |
| (3) 3½ ft. seam . . . . . | 6.86      | 27.24              | 59.47         | 6.4 |

Coke: non-coherent in all cases.



All these samples were from surface coal, so that the percentage of moisture is in all probability higher than what will be found at greater depth.

#### Zymoetz River District.

Two other coal areas were examined rather hastily, both on that branch of the Zymoetz river which rises with Pine creek near the Hudson Bay mountains.

#### Glacier Creek Area.

The first of these is situated near the head of the river, which here occupies a wide, marshy valley. The coal-bearing beds were seen cropping in the bed of Glacier creek, a small stream rising in the Hudson Bay mountains and entering the Zymoetz from the east. The contact of the conglomerate and the underlying volcanics is at an elevation of from 500 to 600 feet above the valley, and at this point the strata are very highly flexed and otherwise disturbed, but have a general high westerly dips. Following down the creek from the contact, it was seen that everywhere the rocks have been severely folded and faulted till near the flat, where they become more regular, dipping under the valley to the best at about twenty degrees.

Some time was spent here in an endeavor to uncover a workable coal seam, but without success, although a number of small seams, from four to nine inches thick, were stripped. It would appear probable that the large seams of Goat creek are here split up into a number of small ones, though it is possible that larger ones do exist, whose outcrops are covered deeply with drift.

The coal here is very hard, with all the appearance of an anthracite, but the one sample taken showed by analysis such a high percentage of ash as to render it useless.

#### Coal Creek Area.

About eighteen miles from Glacier creek, down the Zymoetz river on its north-west bank, another area of the coal-bearing beds is met with. The best exposures are seen in a small stream from the north-east, locally known as Coal creek, which cuts the strike of the rocks at a wide angle. The beds here appear in the general form of a shallow syncline, with a general strike nearly north-west and south-east; but there are many minor undulations and the strata were seen to be faulted in a number of places. The width of the basin is probably about two miles, but its extent along the longer axis was not seen, though it is fairly certain that it does not go any great distance south-east of Coal creek. To the north-west the country has a gentle slope, is heavily drift-covered, and for a considerable distance there are no transverse valleys, so that it was found impossible to trace the coal-bearing beds farther in that direction, in the time available.

A number of coal claims have been staked here by Mr. J. Ashman, but so far little or no work has been done. Two small seams only were seen outcropping in the bed of Coal creek, about one and a half miles above its mouth. The lower of these showed 3 feet of clean coal, while the upper one was 1 foot 4 inches in thickness. Mr. Ashman has since informed me that he overlooked another seam that had been uncovered a short way from the bank of the creek and farther upstream, which was about 5 feet thick, with a small parting. The following analysis is from a sample from the lower or 3-foot seam:—

|                                       |       |
|---------------------------------------|-------|
| Moisture . . . . .                    | 5.45  |
| Volatile combustible matter . . . . . | 34.03 |
| Fixed carbon . . . . .                | 48.17 |
| Ash . . . . .                         | 12.35 |

Coke: partly fritted.

On the other coal properties, which have been described in previous reports, no new work has been undertaken during the past year, as all the owners of the lands in question are waiting for railroad construction, before going to the expense of further development.

#### Mineral Claims.

During the past season comparatively few prospectors were in the district, and new discoveries of importance were rare, while on the older and better known properties little work was attempted, except the annual assessment work required by statute.

On the Hudson Bay Mountains, more particularly on their western slopes, a number of claims are located and a large amount of prospecting has been done. The geological conditions here are very similar to those in the neighborhood of the copper claims of Howson and Scallon creeks, described in previous reports, the ore occurring in dikes from or near the edge of an eruptive area.

The northern part of the Hudson Bay Mountains is composed of rocks of the Porphyry group, chiefly volcanics (andesites, tuffs, etc.), but including, towards the top of the series, some sedimentary beds. These rocks have been very severely folded and crumpled; some splendid examples of folding on a large scale showing very plainly on the bare rocky walls of the higher peaks. Towards the southern end of this group of mountains, extending nearly down to the Telkwa River, there is a large intrusive area of granite-porphry, which has shattered, diked and altered the volcanics near its edge to a very large extent, thus affording channels for the ascent of mineral-bearing solutions.

Most of the chief showings are on a group of claims which are quite close together, and reached by a number of short branch trails from the main Aldermere trail.

#### Coronado Group.

On the Coronado group a considerable amount of work has been done, consisting of open-cuts, by means of which the vein can be traced for the length of two claims. The ore occurs in what appears to be a dike from the intrusive porphyry area, striking about north-east, with a nearly vertical dip, the strike conforming very closely to the slope of the mountain, here very steep. At the lowest opening a cut has been made 35 feet long and 12 feet deep at the face, exposing a lens of almost pure galena, varying from 14 inches in width at the face, to nothing, 12 feet back from it. Four and one-half tons of galena were shipped from the opening to a smelter, but the writer was unable to hear with what result. On the western or hanging wall there are about 3 feet of siliceous vein filling, carrying a little pyrites. A specimen of the clean galena gave by assay: gold \$1.20, and silver 62.63 oz., to the ton.

In the other cuts, farther up the mountain, the ore shows much less galena, but the mineralization is fairly heavy as a rule, one opening exposing about 4 feet of ore with no walls, the ore consisting of galena, blende, arsenical pyrites, pyrites, and lead carbonate in a quartzose gangue, but all much decomposed. A sample from this point assayed as follows: gold \$10; silver 3 oz., to the ton.

Near the eastern boundary of the Coronado, on the west bank of Sloan Creek, a similar and parallel ore body has recently been discovered. Here a lens of galena, nearly pure, but carrying a little blende and



chalcopyrite, has been uncovered, the greatest width of solid ore being 14 inches. This vein has been traced about 200 feet along the strike to the north-east; but as only the surface dirt has been removed in two or three small holes, the character of the ore could not be definitely seen. A specimen of the solid galena on assaying gave: gold \$4.40, silver 36.47 oz., to the ton.

### Victor Group.

The Victor group, consisting of the Standard, Victor, and Triumph claims, is situated west of the Coronado. The ore occurs in and along the east wall of a dike about 60 feet wide, striking about north-east, and dipping at 80 to 90 degrees southwest. It has been traced by means of open-cuts up the hill for a considerable distance. In the lowest cut about 3½ feet of ore is exposed, consisting of galena, blende and pyrites, irregularly and rather sparsely distributed in a gangue of altered dike rock and a little quartz. The ore appears to follow a line of faulting and shearing parallel to the walls of the dike. Fifty feet up the hill the ore has narrowed down to about 8 inches, with 3 inches of clean galena, a specimen from which assayed: gold, trace; silver, 43.33 oz., per ton.

Continuing up the hill, a number of superficial cuts show the dike rusty and decomposed, and varying from 12 to 60 feet wide, with mineralization strongest along the hanging wall. In one of these cuts about 2 feet of ore was seen, composed of blende, arsenical pyrites, with a little galena and chalcopyrite. At the highest opening up the mountain, about 2½ feet of ore is exposed, here highly decomposed, and consisting of stringers of galena, associated with much lead carbonates. A sample from this point gave the following results by assaying: gold, 20 cents; silver, 39.20 oz., per ton.

### Dominion and Newcastle Group.

The Dominion and Newcastle claims are located on the east bank of Sloan Creek, near its head. On this property a dike about 6 feet wide cuts the country rock, consisting of greenish and grayish andesites. The dike, with nearly vertical dip, has the usual northeast strike, and where opened up by means of a shaft and several open-cuts is very heavily mineralized, the chief constituents of the ore being blende, arsenopyrite, iron pyrites, a little chalcopyrite and a very little galena, in a gangue of altered dike rock and much quartz.

Two samples were taken here, the first consisting of the general run of the ore, while the second was from a band of almost pure arsenical pyrites; the results by assay are as follows: (1) gold \$5.80, silver 12.40 oz.; (2) gold \$3.60, silver 0.55 oz.

### Humming Bird Claim.

On the Humming Bird claim very little work has been done (by no means sufficient to prove the extent of mineralization) consisting of several small cuts, the chief one of which is about 15 feet wide, with neither wall uncovered. The rock is much decomposed, with a considerable quantity of a black, earthy material on the surface, which in the laboratory was proved to consist largely of pyrolusite. Beneath this decomposed material the ore is composed of blende, arsenical pyrites, galena, and iron pyrites in a felsitic gangue of altered dike rock, much shattered and brecciated; the mineralization being irregular and somewhat sparse. An assay of a sample from this cut gave the following result: gold 60 cents, silver 10.37 oz., per ton.

### Limestone.

As limestone suitable for smelting purposes has not before been noted from this district, the discovery of a bed of good quality may be of interest. This limestone occurs on the north side of the pass followed by the old trail from Moricetown to Hankins camp, on the Zymoetz River, and not far from the summit. As the only outcrop seen was in heavy timber, it was impossible to ascertain the thickness of the bed, but it would appear to be of good size. The following analysis was made in this office:—

|                                                                     |       |
|---------------------------------------------------------------------|-------|
| Insoluble matter .....                                              | 1.31  |
| Fe <sub>2</sub> O <sub>3</sub> Al <sub>2</sub> O <sub>3</sub> ..... | 1.30  |
| Ca CO <sub>3</sub> .....                                            | 92.41 |
| Mg CO <sub>3</sub> .....                                            | 3.63  |

As the writer was on the point of leaving Hazelton for Ottawa, a number of samples of ore were brought in from a reported discovery near that town. The ore consisted chiefly of stibnite, and gray copper. As the snow was then deep in the mountains, it was not possible to investigate this new find at that time.

### BOOK REVIEWS.

**Electro-Magnetic Ore Separation.** By C. Godfrey Gunther. 193 pages.. Illustrated, \$3 net. Hill Publishing Company, 505 Pearl Street, New York, 1909

Searchers after information concerning electro magnetic ore separation have had to be content with brief paragraphs or chapters in text-books on ore dressing. Mr. Gunther's volume is a compilation of the best available material, supplemented by data gathered by the author himself or submitted by mill managers and manufacturers. One object has been to include only facts which are of present commercial importance. Evidently selection and rejection have been necessary. Mr. Gunther informs us in his "Introduction" that in the United States alone over three hundred patents have been granted on magnetic separators. "The magnetic separator has been developed, in most instances for the exploitation of individual ore deposits, and the different types and modifications so produced might well form subject matter for a book. . . . In view of the above facts the broad practice of magnetic separation is incapable of monopoly, and its application is not determined by any one machine."

Another paragraph indicates Mr. Gunther's conception of the function of magnetic separation: "In its own field, which will be hereinafter outlined, magnetic separation is a useful adjunct to the specific gravity processes, but it is in no sense a competitor with these processes, except in the concentration of magnetite iron ores, and in this application is a success backed up by many years of profitable operation."

The book is divided into eight chapters. Into each of these we shall glance.

"Magnetism Applied to Ore Dressing" is the caption of the first chapter. Mr. Gunther outlines the whole study of magnetism. The application of magnetism to ore dressing is the phase of the subject with which mining men are concerned. This, then, is what Mr. Gunther proposes to present. Even in ore dressing magnetic separation has many refined applications that have not yet become commercial. Magnetic concentration has been applied principally to the treatment of magnetic iron ores, eliminating the gangue and partly separating the phosphorus and sulphur minerals. No



only magnetites, but limonite, chalcopyrite and other minerals are amenable to this treatment. The applications of magnetic separation are much more numerous and complex. After roasting, pyrite and marcasite become magnetic. Calcination transforms siderite and ankerite into magnetic compounds. Thus the separation of these minerals from zinc blende, a wasteful and inefficient process when attempted by wet methods, becomes possible by magnetism. There are other applications too numerous to mention, and, as the richer ores are becoming exhausted, the necessity of attacking lower grades gives more and more importance to magnetic methods.

The difference between specific gravity and magnetic-separation processes is that one utilizes differences in the specific gravities of the minerals to be separated, and the other utilizes the differences in their magnetic permeabilities.

Chapter II. gives the principles of magnetic separation, and preparation of the ore mixture to the magnetic field, attraction of the magnetic particles, removal of the attracted particles from the magnets, necessity of making a middling product, cleaning magnetite concentrate, treatment of fine material, are a few of the stages discussed in this chapter.

Chapter III. describes many types of separators for strongly magnetic minerals. The Grondal, Wetherill, Edison, Wenstrom, and other well-known machines are here illustrated.

In Chapter IV. are presented descriptions of separators for feebly magnetic minerals.

The concentration of magnetite ores is discussed in Chapter V. Results from the concentration of magnetite ores at representative mills, using different kinds of separators, are given. Briquetting of concentrates is touched upon. Several very useful flow sheets are included. This chapter is most instructive.

Chapter VI. deals with the separation of pyrite and blende; Chapter VII. with the separation of siderite from blende; Chapter VIII. with the separation of miscellaneous ores and minerals.

Throughout the book the aim of the author evidently has been to give practical point by taking instances and illustrations from actual practice. Whilst the book is frankly a compilation, the principles that form the basis of magnetic separation and concentration have not been neglected. The author's personal familiarity with his subject has enabled him to weld the various chapters into a coherent whole. His book is timely.

**The Mining Manual for 1908. By Walter R. Skinner.**

A record of information concerning mining companies, arranged in three sections, Australian, African, and Miscellaneous. Twenty-second year of publication. Price \$5 post free.

There are two manuals that every mining engineer should possess. Skinner's "Mining Manual" is one of them. The other, incidentally, is Stevens' "Copper Handbook."

It is impossible to do more than merely enumerate some of the leading features of Mr. Skinner's wonderfully complete volume. Monthly returns of gold outputs, over a period of years, are given for Australasia, Africa, India, and, in the Miscellaneous Section, for many other countries. In addition, lists of mining company directors, of mining company secretaries, and of

mining and consulting engineers and mine managers are appended.

Not only are the names of directors, amount of capitalization, conditions of flotation, etc., etc., specified for each company; but, so far as possible, the financial and physical conditions of each company's property are indicated.

The "Mining Manual" is a supremely useful work. It is a unique compendium of mining information, a directory, and a statistical and historical review.

## EXCHANGES.

**Mining and Scientific Press, May 22, 1909.**—The evolution of stamp-milling practice on the Rand has been saner, more gradual, and more successful than in the United States. This is the gist of an editorial in the current number of the Mining and Scientific Press. "For about ten years, stretching from 1890 to 1900, a sudden outburst of invention from the United States expended its fury in high-geight stamps. The increase from the old standard 750 to the 900 pounder was mainly promoted by cheaper transportation; the change could be made without altering the lines of mortars adapted to the lighter stamps; but when 1200-pound stamps were tried in the old mortars the output suffered, and costs were not reduced." To remedy this, "everything was done except to work out new mortar-patterns on the old model, adapted in details to the larger mass of pulp and to the altered wave-motion." Contrast this with the steady improvement of practice in South Africa. Here the mill superintendents, "with that spirit of conservatism which is so strong in British people, have been working out this problem according to the true principles of evolution, that of gradual change. . . . The result is that 9 tons of ore per stamp per diem is a common duty to-day on the Rand, obtained with 1,600-pound stamps." United States stamp-milling has not kept pace with the Rand. Nine-tenths of United States mills may be pronounced anachronisms. The cyanide process has advanced faster in the States than in South Africa. But the engineers on the Rand "are coming down the home-stretch at a rapid pace. They have perceived the need and value of co-operation and exchange of ideas as we have not."

**The Mining Journal, May 22, 1909.**—In a lengthy editorial the Mining Journal animadverts upon the disabilities under which the gold mining industry of Rhodesia suffers. The mining rights are vested in the British South Africa Company, which company administers the law. Recently, ordinances have been promulgated imposing a graduated tax upon the gross output of gold mines. The tax ranges according to the value of the gross output, from 2½ per cent. to 7½ per cent. The tax on base metal claims is lighter. But a property yielding ore from which any gold is extracted must be registered as a gold reef claim, and pay at the above rates for its total production. The Mining Journal quotes an instance in which the value of copper recovered is greater than that of the gold. The royalty in this case would amount to 20 per cent. of the mines' net profit. It is predicted by our contemporary that new enterprises will need exceeding attractive propositions to induce them to face these conditions.



**PERSONAL AND GENERAL.**

Mr. A. A. Cole, mining engineer to the T. & N. O., was in Toronto on June 7.

Hon. Mr. Templeman, Minister of Mines, is to visit Nova Scotia and New Brunswick some time in June.

Mr. F. G. Stevens, mining engineer, of Etzatlan, Jalisco, Mexico, was in Toronto on June 3rd and 4th. Mr. Stevens is a graduate of the Kingston School of Mining.

The Minister of Labour has appointed Mr. Charles Archibald, of Halifax, N.S., to the Conciliation Board that is arbitrating between the Cumberland Railway and Coal Company and its employees.

Mr. A. H. Brown, of Cobalt, Ont., who has made a specialty of cyaniding and milling, was in Toronto on May 31st. Mr. Brown, after spending a month in Gowganda, will return to Cobalt. His headquarters there will be the Coniagas mine.

**Correspondence.****Letter from Sir Henry Mill Pellatt.**

J. C. Murray, Esq.,

Canadian Mining Journal,

Toronto.

Dear Sir,—The death at Cobalt of Mr. E. L. Fraleck, Mining Engineer, after a short illness, came as a great shock not only to the management of the Cobalt Lake Mining Company, but also to his numerous friends throughout the Province.

Mr. Fraleck has been superintendent of the Cobalt Lake Mine since its organization in February, 1907. He always had the support of the directors of the company, as they had absolute confidence in his integrity and ability.

Mr. Fraleck's work was for many reasons one of the most difficult in the camp, but he was able to surmount all obstacles successfully.

The company will have great difficulty in securing an engineer to fill the position left vacant by the death of Mr. E. L. Fraleck.

HENRY M. PELLATT,

President Cobalt Lake Mining Company.

**LETTER FROM MR. MARRIOTT TO THE SECRETARY OF THE C. M. I.**

1 London Walls Bldgs.,

London, E.C., May 13, 1909

The Secretary, Canadian Mining Institute,

Rooms 3 and 4, Windsor Hotel, Montreal.

Dear Sir,—I beg to thank you for your favour of the 28th ult., containing a circular in connection with the prize offered to your Institute by Messrs. Frecheville, Commans and myself.

We note that, therein, you have further explained the scope of the papers eligible for the prize. Elimination of some sort is doubtless necessary for the guidance of the judges of the papers presented, but it appears to us that the wider the scope of the competition the more competitors will include and the more valuable will it be to the Institute. Our object in stipulating that the papers accepted shall include the most recent developments was to ensure that they should contain up-to-date matter which would be instructive to us, your guests of last year, and generally useful as containing the most recent information of Canada. If the contributors elect to put in still more work and to enlarge their papers to include history leading up to these recent developments, so much the better.

We trust that the prize will bring forth many competitors, and that it will produce several papers worthy of your country.

Yours faithfully,

(Signed) HUGH F. MARRIOTT.

**SPECIAL CORRESPONDENCE****NOVA SCOTIA.**

Glace Bay, June 4.—“Gluckauf” of the 15th May contains a summarized translation of articles which have appeared in the “Canadian Mining Journal” relating to the Dominion Coal Company's Rescue Station, and of a paper describing the use of breathing apparatus at the Sydney Mines Fire, which was recently read before the Institution of Mining Engineers in England. The article is very complete, and is from the pen of Bergassessor Grahn, a prominent German engineer, who has made a specialized study of mine rescue apparatus. An earlier issue of “Gluckauf” contained the first part of a description of Canadian coal and iron mines by Dipl. Ing. Kraynik, one of the gentlemen who visited Canada last summer on the occasion of the joint visit of the Iron and Steel Institute and the Institution of Mining Engineers. Herr Kraynik's article is extraordinarily complete, considering the brief stay he made in this country. “Gluckauf” is the leading mining periodical of Westphalia, and the consecutive appearance of two such complete descriptions relating to our Canadian mining industry is a proof of the useful nature of such visits as that just referred to, and also of the interest that our industries are creating in Europe.

The Board of Conciliation asked for by the U. M. W. A. at Sydney Mines has been granted by the Government, but the Board is not yet constituted. The Nova Scotia Steel Co. refused to appoint a representative, and the Government appointed Judge McGillivray. As at Glace Bay, the U. M. W. A. representative (and incidentally District U. M. W. A. President) failed to agree with the company's representative on a third arbitrator, and this duty will again devolve on the Government. Although this is the second occasion on which the U. M. W. A. President has been accepted by the Government as an “arbitrator” on a Board of Conciliation, it has not become apparent how such an interested person can “arbitrate” on the matters which the Conciliation Board will have placed before them.

At Springhill Mines the same procedure has been gone through as at Glace Bay and Sydney Mines. At this place Messrs. E. P. Paul and Charles Archibald could not agree on a third member and the Government has appointed Judge Longley as chairman.

For a society which has passed a resolution utterly condemning the Canada Industrial Disputes Act, root and branch, the U. M. W. A. nevertheless bids fair to become a record applicant for Conciliation Boards. Three in Nova Scotia, one in Alberta,



and further trouble brewing in British Columbia (where the U. M. W. A. is trying to call out the miners of Vancouver Island in a sympathetic strike with those in the Nicola district) is a fair number of disputes to have going on at once.

One of the pet shibboleths of the U. M. W. A. delegate in Canada is that his society is not here "to make trouble." The facts hardly tally with the expressed aims of this society.

May outputs were a decided improvement on those which have been obtained so far this year, although they were, of course, much less than those of last year. It is probable that although the production of coal will not reach such high figures as it did last year, yet the outputs will be more evenly sustained throughout the late summer and the autumn. There is a distinct optimism in Cape Breton just now, and so far this year more money has been spent on the erection of house property and improvements than has been the case for several years past.

The yearly examination for manager's underground, manager's and overman's certificates of competency has been held in Sydney, occupying three days, beginning June 1st. An unusually large number of persons presented themselves for examination. It is said that this is the last occasion on which the examination will be conducted under the present Board of Examiners, and that shortly the examination of aspirants for certificates will be placed under the direction of the Director of Technical Education.

The limitation of certificates of competency for mine officials by provincial enactments is a matter that we think should be remedied. There does not appear to be any good reason why a man who is considered competent to undertake the direction of a mine in Nova Scotia should not be qualified to act as an official in Alberta or British Columbia. We do not suggest that the provincial governments should not issue such certificates in each province, but it should not be necessary for a fully qualified mining engineer to undergo an examination in every province in which he may happen to be engaged. Some day, no doubt, the Federal Government at Ottawa may see fit to issue a certificate that will cover the whole Dominion. Such a certificate would, of course, require to be surrounded with conditions and safeguards which would prevent any abuse thereof.

#### ONTARIO.

**Cobalt.**—The pipe for the Hydraulic Company is being distributed around the camp, and it is now stated that air will be ready for delivery about the first of August. It is very doubtful, however, if this will be possible, considering the amount of work still to be done. More machine drills have been ordered for the cutting out of the air chamber above the tunnel, it being found that the hammer drills did not give good satisfaction. There are nine miles of 20-inch pipe to be laid between Ragged Chutes and the town, and from the end of this line a 12-inch loop will encircle the town. In addition there will be branch lines out by the Colonial and Kerr Lake Mines. The pressure in the main will be about 110 pounds to the square inch, and the air is to be delivered at the mine at a pressure of 100 pounds. Large users will buy air by meter, while the smaller consumers will pay according to a sliding scale. The terms are as follows:—

For large consumers buying by the meter, twenty-five cents per thousand cubic feet of air at 100 pounds pressure. The following rates per drill per ten-hour shift have been fixed upon for the smaller users:—

|                                  |        |
|----------------------------------|--------|
| 1 drill, per 10-hour shift.....  | \$5 00 |
| 2 drills, per 10-hour shift..... | 4 00   |
| 3 drills, per 10-hour shift..... | 3 50   |
| 4 drills, per 10-hour shift..... | 3 13   |
| 5 drills, per 10-hour shift..... | 2 80   |

In addition, those mines not using more than five or six drills will have to pay for their own connections with the main

line. Figuring on the basis of twenty-five cents per thousand feet, this gives the cost per drill for one shift approximately \$2.50, that is, supposing the drill to be working all the time. In reality, however, the machine is actually drilling little more than half the time, which gives a net cost per shift of about \$1.25. This leaves a very wide margin in favor of the consumption by meter, and it is altogether probable that before anything definite is done in the matter, some concerted action will be taken by the mines to force the Hydraulic Company to give a more uniform rate to all purchasers.

The transmission line for electrical power from Fountain Falls is expected to be completed about July first. The rates are stated to be as follows:—Under 25 h.p., 3 cents per kilowatt hour; between 25 and 50 h.p., 2 cents per kilowatt hour; between 50 and 100 h.p., 1 3-4 cents per kilowatt hour; between 100 and 200 h.p., 1 1-2 cents per kilowatt hour; between 200 and 300 h.p., 1 4-10 cents per kilowatt hour; between 300 and 400 h.p., 1 3-10 cents per kilowatt hour; between 400 and 500 h.p., 1 2-10 cents per kilowatt hour; over 500 h.p., 1 cent per kilowatt hour. In addition to this there will be a service charge of \$1.00 per month per horsepower on the rated capacity of the meters. A discount, with a maximum of 13 per cent., will be allowed, the same to be based upon the load factor.

Progress is being made on the erection of the new concentrator for the Colonial Mine. The framework is being erected and the stamp batteries are already set up. A five by sixteen foot tube mill to be direct driven from a motor has also been ordered. The mill will not turn over until the electric power company have their power ready for distribution, and it is expected that the mill will be completed by then.

The largest float, silver nugget ever seen in this district was found on the property of the Gem Mining Company, situated near the southeast part of Giroux Lake. It measures 5 feet 7 inches in length, is 2 feet 4 inches wide, and about sixteen inches thick. The weight is over a ton. The company will shortly start trenching on the property.

Following the discovery of ore in the Beaver Mine, the company has decided to rebuild their plant, which was burned down some time ago. The new vein is being drifted on, and the values are as good or better than when it was first discovered.

There is a great rush up the Montreal River from Latchford, eight hundred men having made the trip up on the boats in six days, while a great number had to remain behind, failing to get accommodation. Over thirty cars of freight billed up the river are tied up at Latchford owing to the inability of the navigation company to handle them in the present condition of the river.

The opening of navigation has caused increased activity to be displayed in the district of South Lorraine. Among the principal properties in this section are the Keeley, Wettlaufer, Haileybury Silver, Montrose, South Lorraine Development, Harris, Kelley-Jowsey-Wood, and the Great Northern. The majority of these properties are controlled by Buffalo capitalists. The Kelley mine is installing a large plant consisting of a 150-h.p. gas producer and a 12-drill compressor. The Wettlaufer is also installing a plant consisting of two 60-h.p. boilers and a five-drill compressor, which it is expected will be running in about a month's time. The South Lorraine district was located in the fall of 1907, but work was not started until the following spring, and although up to date the amount of ore shipped has been small further development is expected to bring the district well to the front.

Work will be stopped in the drifts of the Station Grounds Mine until the air from the Hydraulic Company is ready for delivery. Previous to this the company had been purchasing air from the Cobalt Lake. In the meantime prospecting will be carried on with a diamond drill.

At the Farah Mine the second discovery within two weeks was made on May 24th, when a new vein carrying silver was



discovered. The shaft, which is being sunk about the middle of the property, has reached a depth of 100 feet, but will be continued deeper before a crosscut is started.

Recently one of the easterly workings of the Nipissing went through the Keewatin formation into the diabase. As it is generally considered that the diabase was the agent that brought up the valuable minerals this discovery will probably have an important bearing on the future development of the mines. More extensive exploration of the Keewatin may be looked for in the future, and the probability is that a good deal of diamond drilling will be done to determine the thickness of this series.

The Crown Reserve now has workings about 60 feet deep in the Keewatin and the values are reported to be fully as good as in the overlying rock. One of the Nipissing veins has also at the present time excellent values in the Keewatin.

On May 28th another new strike was made at the King Edward Mine, on the No. 5 vein. The ore shoot was encountered while drifting west at the 80-foot level, and it is about four inches in width, consisting of calcite and native silver.

One of the finest specimens of silver ore ever produced in Cobalt was taken recently from the Crown Reserve. The piece measured 18 x 22 x 16 inches and is valued at over \$2,000. It has been sent to the Geological Survey at Ottawa and will form a part of their collection.

The Keystone Cobalt Mines, Limited, owning property in South Lorraine, has started work at surface prospecting. This property was purchased last fall by Bradford, Pa., parties.

There are two diamond drills operating at the Foster Mine. One is at the 210-foot level and the hole is now under Glen Lake. The formation is Keewatin and it is desired to ascertain whether or not the Huronian slates come in, as was found to be the case underlying the diabase at the Big Pete. The other drill is working on the surface. Two machine drills are also being worked underground.

The report of the Otisse-Currie shows that up to date the sum of \$31,000 has been spent on the development work, plant, supplies, etc. It is proposed to sink another shaft in the north-east corner of the property on a vein found in that section, and the different shafts will be connected underground. The present shaft is also to be sunk to a depth of 150 feet, at which level a crosscut will be run across the property, after which sinking will be continued to a depth of 250 feet. It is proposed to continue the ore shipments during the summer months by hauling to Elk Lake and from there shipping by boat to Latchford.

At the Big Pete mine of the Cobalt Central about four hundred feet of work has been done in the Huronian slates underlying the diabase and the results are very satisfactory, some of the finest showings in the mine being found at this depth. The shaft which down 260 feet, will be continued another 50 or 75 feet as soon as possible. The diamond drill has shown that all over the property the Huronian slates underlie the diabase, the knowledge of which will be of great value to the Big Pete and the surrounding mines in deciding upon their future development. During the month of May the Cobalt Central Mill treated 750 tons of low grade ore for the Kerr Lake.

The Donaldson claims at Bloom Lake have been sold to New York capitalists. Mr. J. Hermon, formerly of the Progress Mine, will take charge of the property.

Last fall Mr. A. M. Bilsky and his associates in the Jacobs Exploration Company purchased 168 acres adjoining the Nipissing and Chambers Ferland on the north and the Temiscaming and Hudson Bay to the north-east. To operate this property a company, known as the Cable Silver Mines Company, Limited, was formed. This is a close corporation. A considerable force of men are now engaged in trenching and some good indications have been uncovered. As soon as the air from the Hydraulic Company is on the market preparations will be made to sink.

The Silver Nugget is a property that adjoins the Lawson and the University on the south, and it takes in a part of the eastern portion of Giroux Lake, in which there is located an island of considerable size. On this island a shaft was sunk to a depth of 120 feet on a 4-inch vein of calcite, carrying iron, copper and galena, and from the bottom 150 feet of drifting was accomplished. At the time this work was being carried on compressed air was leased from the University Mine, but subsequently when operations commenced on the Lawson the lease for this air expired and now new arrangements will have to be made to secure similar power. In the meantime, while these arrangements are being made, two diamond drills will operate, one to be placed on the island and the other on the mainland, and the holes will be bored to tap the veins at depths of 200 feet from the surface. The indication which will be tested on the mainland is a decomposed calcite vein about nine inches wide. A great amount of interest has been shown in this as it has been traced on the surface from the southern extremity of the famous Lawson vein. This property also belongs to the Jacobs Exploration Company.

A short time ago a number of engineers working for the Provincial Government commenced a resurvey of the 20-acre lots of the Gillies Limit, which have been put up for disposal by private tender. Those best posted say that sale will not create nearly the amount of interest formerly expected. Had it taken place two years ago the Government would have been ahead to the extent of millions of dollars. Lack of interest is due largely to the fact that the Provincial Mine, which is surrounded by the lots to be sold, is so far a flat failure. About \$100,000 has been expended on the mine, while the returns from ore shipments will hardly net a tenth of that amount.

A new record for ore shipments in the Cobalt camp was made in the month of May when 43 cars of high grade, 2 cars of medium, and 35 cars of low grade were shipped. This makes 80 cars of ore, having a total weight of 5,017,433 pounds.

## BRITISH COLUMBIA.

**Rossland.**—The sempiternal optimism of the Rossland mining and business man is once again to the fore and in this district it is felt that there are busy and prosperous days in store for the mines of this camp in the very near future. Well may we feel a little hopeful as we look over the situation at the Centre Star group of the Consolidated Co., working conditions at the mines of the Le Roi 2, Limited, activity in the South Belt, the growing industry of the big smelter and refinery at Trail, a few miles down the hill, and the assurance that a big plan of development from the 1,650 to the 2,650 levels will be begun at the Le Roi mine as soon as a few financial arrangements have been completed by that indefatigable managing director of the Company, Mr. Anthony J. McMillan.

The production of the Consolidated Company's smelter at Trail for the month of April was as follows: This work treated 35,490 tons of gold, copper, silver and lead ore, extracting 410 tons of copper matte and 2,264 tons of lead bullion, which contained in gold, \$214,835; silver, \$101,891; copper, \$44,232; and lead, \$146,110, or a total metallic production of \$507,068. Of this product the refinery turned out metals to the value of \$246,371. From June 30th, 1908, to April 30th of this year the Trail smelting works produced precious and useful metals to the value of \$4,088,940, about \$2,096,461 of which must be credited to work at the up-to-date refinery in operation there. If this rate of production is maintained until June 30th, 1909, this year's product will be worth nearly \$1,800,000 more than that for the last fiscal year. This certainly shows progress.

The gross production of the Le Roi 2, Limited, for April was \$67,770 for 2,200 tons of gold-copper ore, or something over \$30.80 per ton, making the net profits of the company for that



month between \$35,000 and \$40,000; this spells a magic word to the stockholder—dividends.

The president of the Blue Bird Mining Co., visited the camp a few days ago and looked over the property. Drifting on the ledge is in progress and ore is being got out for shipment. The ore at 40 feet deep in the shaft, where 60 foot of drifting has been done, maintains a width of one to three feet and looks persistent. The reef on which this property is located runs through the south belt and in a westerly direction over the hills to the Southeastern Boundary district; there are mines working at different points along its course and it is probable that this vein will become well known in local mining annals before many years have passed. The present lessees of the Blue Bird may have to give up their lease when it expires, which will be in about five months, as Mr. Carter is trying to work out a plan whereby the Company will take over and operate the property itself after the expiration of the present lease. On this same lead the Hattie Brown and Richmond are also working at present. Shaft work is being done on both properties with a view to developing the vein.

**Boundary.**—The Boundary ore production for the week ending May 29th (18,377 tons) exceeded that of the preceding week by 4,637 tons, and it is more than likely that next week will see an even greater increase as during the past week the third augmented furnace at the Grand Forks smelter of the Granby Consolidated was put into operation and the next few days will see No. 4 blown in and work resumed at the Gold Drop outlet. The Granby and Snowshoe are the only steady shippers in this district just now, with an occasional shipment from the Golden Eagle and Sally. It is to be hoped that the B. C. Copper Co. will resume work early, now that the Alberta coal miners' strike has been settled, and that the Dominion Copper Mines will be on the shipping list again in the impending future, as present rumor would have it. Of course, this last looks doubtful, there are so many factors in the case, but if some party gets a cinch on the property at the sale in Vancouver, May 28th, then it is likely that work will be started, for it costs too much to let a big mining and smelting property like this lie idle. The mines have been kept unwatered and the machinery in good repair so that it would be no gigantic task to start work.

The Snowshoe Mine is shipping 10,000 tons of ore per month regularly to Trail smelter, where it is valuable as a flux, and is used with the Rossland and Slocan ores. All ore is at present being taken from above the tunnel level in the Snowshoe, there being an abundance for all present requirements, and the mine will not be unwatered below the level of the adit for the present. The report of the Snowshoe Mining Co. shows that that company is making a good profit on its lease of the Mine to the Consolidated Co. and is steadily paying off some of its old debts at the bank.

The Canadian Pacific Railway Co. has commenced surveying the 12-mile branch line that will run south from Hartford to Wellington and Central camps and to the Lone Star Mine in Washington, which the B. C. Copper Co. controls. This will give the Copper Co. railway facilities for its No. 7 mine in Central and its Athelstan Fr. and Jack Pot claims in Wellington. The company has 200,000 tons of ore ready for shipment from the No. 7 and about 80,000 tons from Wellington. This would seem to predict heavy operations for the B. C. Copper Co. during the latter months of this year.

This work of driving the big tunnel at Greenwood is now going along smoothly and the adit has been advanced nearly a hundred feet into the hill already. The operators, the Greenwood-Phoenix Tramway Co., are contemplating the installation of an eight-foot tunnelling machine of the Swiss-Chandler type. This will cost in the neighborhood of \$60,000 but in the end would prove very economical, under good working conditions.

The shaft on the Golden Zone, near Hedley, is now down about 115 feet and at that depth the vein has been proved up ten feet wide and assays of \$20.67, \$45.47 and as high as \$82.68 per ton in gold and \$1.10 silver have been obtained. The five-stamp mill will shortly be put into operation. This mill is equipped with ten-stamp equipment and the other five stamps will be added when required.

**Slocan—East Kootenay.**—The much jumbled affairs of the Sullivan Group Mining Co., with mines at Kimberley and smelter at Marysville, are again on the carpet and owing to the backwardness of some 35 per cent. of the shareholders, the bondholders are going to take things into their own hands and proceed with reorganization. The latest plan set forth is to issue 1st preferred stock bearing 7 per cent. annual dividend, to cover the amount of the bonded indebtedness, with interest, amounting to over \$400,000. Second preferred stock, bearing same dividend rate, will be issued to cover the other outstanding liabilities, which are over \$60,000. This stock, however, will differ from the 1st preferred in that it will be subject to recall by the company at par. Common stock will be issued to the amount of the 1st preferred stock and this will be divided among the bondholders, as they are, of course, to pay all costs of reorganization, etc. The bonds are at present held by the Federal Mining & Smelting Co. in which the Guggenheims are heavily interested. The Sullivan Company's smelter is said to be worth about \$500,000 and there are about 150,000 tons of ore blocked out in the mine which will average 15 per cent. lead, 6 1-2 ounces silver and a percentage of zinc—and "there's the rub." It is the zinc, probably combined with a little poor management, that has got the company into its present fix. The ore is difficult to treat now that the zinc has come in more plentifully at depth and this problem the new company will have to solve to put the concern on a first-class basis of operation.

The manager and part owner of the rich Westmount claim has just returned from the east where he has made arrangements for a plan of development to be done on that property. The work will be begun at once, on No. 3 tunnel. It will be remembered that Mr. Griffith drove his 1000-ft. prospect tunnel alone in the rugged hills, working sometimes for months at a stretch without hearing the sound of a friend's voice; such pertinacity certainly deserves the reward that Mr. Griffith reaped when he broke into the long-coveted ledge, from which he shipped nearly 400 tons of high-grade silver lead ore last year.

The Dunsmuir interests, whose name is synonymous with big coal mines in this Province, will begin work on the Noble Five group at Sandon in the near future. This is a promising property which local miners have tried in vain to lease lately, knowing its prospective value. Part of the ore is of a concentrating character and there is an old concentrator on the ground that will be fixed up.

A gold strike has been made on the Cascade river near Devil Creek, about three miles from Bankhead, Alta. Samples of the sand submitted for analysis to Dr. Taylor of Bankhead, show coarse-grained gold in good quantities.

The McGillivray Creek Coal & Coke Co., near Coleman, have just about completed arrangements for the installation of 10,000 feet of electric railway from the mines to the track of the C.P.R., also for a new steam power plant and tippie. The stock of the company is heavily held in Spokane, Wash., and B. E. Sharp of that city is secretary and treasurer. The company owns 3,000 acres of promising coal land is forging ahead in good shape.

It is stated that work will be resumed on the Mohican group of the Poplar Creek gold mines in a short time. There is a very good body of concentrating ore in the tunnel on this property. Nine tons have been shipped as a test, but as railway facilities have been lacking it has been difficult to get ore out to the smelter.

May 29th, 1909.

# GENERAL MINING NEWS.

## NOVA SCOTIA.

**Springhill Mines.**—One May 28th Tillman White was fatally injured in No. 2 shaft. He was caught by the trip. White was a native of Springhill.

**Mabou.**—Judge MacGillivray has filed his decision in the matter of the lien for labourers' wages, materials, etc., against the colliery of the Mabou Coal and Railway Company. Two hundred and seventeen claims were filed and proved. Valid liens to the amount of \$7,897.51 were proved. The total amount of claims allowed, including personal judgments, was \$9,908.02.

**Sydney.**—The Board of Examiners, presided over by Mr. R. D. Anderson, Deputy Commission of Mines, began its session on June 1st. One hundred candidates are taking the mining examinations.

## QUEBEC.

**Sherbrooke.**—The British-Canadian Asbestos Company, Limited, has made many changes in its mill during the past winter. There are now six cyclone pulverizers installed. Mr. E. Slade, the manager, superintended the alterations.

At the Dominion Asbestos Co.'s plant of cyclone pulverizers have been replaced by rolls.

The Suffield copper mine, six miles south of Sherbrooke, is being developed under the management of Capt. Wm. Jenkin.

## ONTARIO.

**Cobalt.**—Cobalt's tonnage for the first five months of 1909 is about 12,400 tons, or practically 5,000 tons in excess of the shipments for the first five months of 1908. Crown Reserve is one of the mines that made a record in May. It sent out eight cars of high-grade ore and two cars of fair ore.

Of the eighty-one cars shipped from the camp during May 43 were high-grade.

**Cobalt.**—The Beaver mine is shortly to make a shipment of high-grade ore.

During the month of May the silver production of the La Rose will be the result of heavy shipments of high-grade ore. The month's output amounted to 525 tons, of which 297 tons were of high-grade ore, averaging between 2,500 and 3,000 ounces of silver to the ton. On May 31 La Rose sent out 43 tons of high-grade and two tons were made up of metallies, almost bullion.

This was the last month in the company's year; a clean-up was possibly made. However, on June 1 the company had 62 tons of high-grade sacked and three cars of second-grade ready for shipment. A car of high-grade was also ready to be crushed.

Two hundred and seventy-five men are now employed by La Rose Consolidated Co. Trenching will soon be started on undeveloped acreages owned by the company, so that the number of men will be materially increased.

**Port Arthur.**—The rush for the Sturgeon Lake gold district gold district will begin in the first week of June. Navigation will then be open. A new 100-foot stern paddle steamer has been placed on the lake by the New Ontario Transportation Co. This will connect with the C. P. R.

## ALBERTA.

**Coleman.**—At the meeting of the Canadian Mining Institute, held at Coleman, Alta., on the 25th inst., W. A. Davidson, M.E., occupied the chair. Several papers were presented. One of these was by M. J. Powell, mine manager of the International Company's mine, of which a description was given, together with the particulars of the system of ventilation and of haulage; another was by E. Jacobs, on "Notes on Coal Mining, etc., in Alberta," this being a summary of recently published official reports; and a third, by F. W. Gray, of Sydney, B.C., on "Oxygen Breathing Apparatus in Coal Mines."

## BRITISH COLUMBIA.

**Hedley.**—The Nickel Plate mine has been bonded by the Daly estate to M. K. Rogers for a large sum. The Nickel Plate is equipped with a 40-stamp mill, which has been in operation for ten years.

**Rossland.**—Mr. G. O. Buchanan, lead bounty commissioner, has received the cheques for the lead bounty up to March 31st. The mines entitled to the bounty are as follows: Alpha, American Boy, Arlington (Erie), Arlington (Slocan), Peterborough Trading Co., Banker, Bismarck, Black Diamond, Bluebell, Canadian Group, Cook, Early Bird, Elkhorn, Emerald, Flint, Frances, Hot Punch, Giant (Golden), Jessie, Bluebird, Last Chance, Gallagher, Maestro, Maggie, Niel, Pontiac, Queen Dominion, Rambler-Cariboo, Reco, Rio, Richmond-Eureka, Ruth, Sally, Silver Bell, Silver Sovereign, Ruby Silver, Spokane Standard, Sunset, Vancouver, Wellington, Westmount, Whitewater Deep, Hewitt, Wakefield, St. Eugene, Ymir, Blue Bird (Rossland).

**Trail.**—The value of the B. C. Smelter product of the Consolidated Mining and Smelting Company for April is reported to be \$507,068. For the past ten months it amounts to \$4,083,940. More than half of this came from the refinery. Improvements and enlargements being carried on have not interfered with the output.

**Rossland.**—Le Roi mine, it is persistently rumoured, is to start again very shortly.

**Rossland.**—The largest copper furnace in Canada has been blown in by the Consolidated Mining and Smelting Company at Trail. The dimensions of this furnace are 42 inches by 25 feet. The company has now four large copper furnaces, with a capacity of 1,800 tons of ore per day. Mechanical feeders are being installed on the large lead furnace, which now produces more lead bullion than any other lead furnace on the continent.

**Vancouver.**—On May 28th bids aggregating \$155,000 were made for the Dominion Copper Company's properties. These bids were not sufficient to equal the reserve bids fixed by the court, and the sale was postponed until June 4. The property was offered in two parcels. The Hayden Committee, represented by Samuel Untermeyer, was the only bidder. The Lincoln Committee made no bids whatever.

**Victoria.**—Working under instructions from the Federal Department of Mines, Mr. R. H. Chapman is about to commence a topographic survey of Vancouver Island.



## MINING NEWS OF THE WORLD.

### GREAT BRITAIN.

The directors of the Cape Copper Company, Limited, have announced an interim dividend of 1s. 6d. per share, free of income tax, on the cumulative preference and ordinary shares.

With an eye upon the present strained relations between miners and operators, the Admiralty officials are particularly active in placing orders for steam coal in the Welsh coalfields. In the last week of May, vessels were charged at Cardiff for the carriage of 50,000 tons of coal for home depots.

The Scottish Coal Miners' Federation refused to go to arbitration over the men's demand for a daily minimum wage of 6s. This has practically dissolved the Scottish Coal Conciliation Board. Nine-tenths of the coalmasters are losing money. Thus both coalmasters and miners are preparing for a crisis. The miners number 80,000 men. They have an accumulated fund of £70,000.

### GERMANY.

All the employees of the West Bohemian Mining Association in the district of Mies, Bohemia, have gone out on strike. The men demand a fixed minimum wage.

### SOUTH AFRICA.

The long-continued dispute between the Government and the mining companies in regard to their respective rights in the Bewaarplaatsen and water rights areas has been settled. The claim areas will be worked by the companies, the Government taking 40 per cent. of the net profits.

A great extension of deep level movement is taking place. Hundreds of claims are being taken up at points far removed from the outcrop of the main reef.

The successful flotation of the Carolina Asbestos Development Company has been followed by the purchase, for development and

flotation, of several adjoining properties in which the Lydenburg Estates, Limited, and other owners are interested.

The total output of gold from Rhodesia for the month of April was 52,906 ounces, valued at £222,700; as against 48,030 ounces, valued at £202,157 in the previous month. The output of other minerals during April was: Silver, 21,495 oz.; lead, 82 tons; copper, 4 tons; chrome ore, 1,748 tons; asbestos, 28 tons.

### AUSTRALIA.

What is claimed to be the largest body of silver-lead ore yet found in South Australia was discovered recently about 23 miles south of the Olary railway station.

The number of men employed last year in the gold mining industry in Western Australia was 16,500. Money expended in wages, stores, and freights, amounts to about \$26,000,000. Dividends paid, totalled \$7,350,000.

### UNITED STATES.

The National Mining & Smelting Co., Deming, New Mexico, is to treble the capacity of its plant. Latterly the mine has been closed.

The Butte Central and Boston Copper Corporation is to resume work in the Opir Mine. The corporation has been reorganized and has adopted a new name—the Butte Central Copper Co. A concentrator is to be erected.

Rawhide, Nevada, is soon to have ample mills of its own. The King Heizner mill will be completed early in July. Other mills are projected.

The Miami Copper Co., Globe, Arizona, is erecting the first unit of its overground capacity. The power-house, bins, mill, etc., will be built to a capacity of 1,500 tons of ore daily.

The Interstate Mining Co., Wallace, Idaho, has raised over \$100,000 wherewith to equip its property. The proposed development includes driving a 3,000-ft. tunnel.

## COMPANY NOTES.

The Dominion Copper Co. has been purchased by the bondholders' committee, of which Charles Hayden, of Hayden, Stone & Co., is chairman.

The shareholders of the Temiskaming & Hudson Bay Mining Company have empowered the directors to raise the capitalization from \$25,000 to \$3,500,000. It is reckoned that on that basis one share of the old company will be worth 400 of the new, and that on that basis it will be distributed.

The 400,000 shares left in the treasury after the distribution of the stock on the new basis will be used for the erection of a concentrator at the plant on the most northerly lot of the company where the mine is at present, and the development of the south end of the property. The directorate believe that there are excellent possibilities at the end near the Silver Queen, and very little has been done there.

Two years ago a shaft was sunk near the line of the Temiskaming & Hudson Bay and the Silver Queen, and mining was in operation there before the big vein was found on the other end of the holdings.

### TILT COVE COPPER.

The report of the Tilt Cove Copper Co., Ltd., for 1908, was presented at the meeting on May 25th, and states that the profit and loss account shows a credit balance of £9,107. The Cape Copper Company's Tilt Cove establishment audited accounts for the year show that the mines made a gross profit of £26,627, which, after charging the account with the rent (representing the interest on the debentures), prospecting costs, management, etc., and after adding the balance brought forward, with interest, etc., leaves a net profit of £21,323, with £53,256 to be carried forward to next year's accounts. The balance of profit thus remaining has been dealt with as follows: £10,662 has been retained by the Cape Copper Co. and £10,662 has been received by this company as its moiety of profit, as provided for in the agreement with the Cape Copper Company. Although a profit of £21,323 is shown on the establishment account, that result includes the items of £36 released from the amount of profit spent on buildings and machinery and £944 from the amount retained for working capital. This company's share of the £944, together with the £36, has been deducted from the capital expenditure on the one side of the balance-sheet and from the

reserve for depreciation on the other. Out of the available profit of £12,581 an interim dividend of 1s. 3d. per share was paid on 2nd December, 1908, £1,665 has been paid in income tax, and the committee now recommend a final dividend of 6d. per share, making a total distribution of 1s. 9d. per share, of 4% per cent. for the year, leaving £3, 127 to be carried forward.

### INTERNATIONAL NICKEL CO.

The International Nickel Co. and constituent companies in America, of which the Canadian Copper Co. at Sudbury is one of the chief producers, reports for the fiscal year ended March 31, 1909, as follows:—

|                                       |             |                |
|---------------------------------------|-------------|----------------|
| Earnings . . . . .                    | \$2,162,694 | Dec. \$272,259 |
| Administration expenses, etc. . . . . | 139,393     | Dec. 10,191    |
| Net income . . . . .                  | \$2,023,401 | Inc. \$262,068 |
| Deductions, depreciation . . . . .    | 267,102     | Inc. 51,127    |
| Mineral exhaustion . . . . .          | 100,205     | Inc. 5,853     |
| Bonds sinking fund . . . . .          | 177,000     | Inc. 8,750     |
| Interest bonded debt . . . . .        | 473,500     | Dec. 8,550     |
| Total deduct. . . . .                 | \$1,017,807 | Inc. \$57,180  |

|                                   |             |                |
|-----------------------------------|-------------|----------------|
| Balance . . . . .                 | \$1,005,494 | Dec. \$319,248 |
| Preferred dividend . . . . .      | 534,734     |                |
| Surplus . . . . .                 | \$470,760   | Dec. \$319,248 |
| Previous surplus . . . . .        | 2,216 799   | Inc. 461,182   |
| Total surplus . . . . .           | \$2,687,559 | Inc. \$141,934 |
| Reserves . . . . .                | 230,599     | Dec. 98,227    |
| Profit and loss surplus . . . . . | \$2,456,960 | Inc. \$240,161 |

President A. Monell, in his remarks to the stockholders, says that all construction work has now been completed, with the exception of repair shop and foundry, at Copper Cliff. The report continues:—

"The last fiscal year followed as an aftermath of the panic of 1907, and brought with it all of the depressing conditions incident to such a state of affairs. Many of our customers worked their stocks up very close. As our sales are largely to steel manufacturers, they are susceptible to the influences which govern that industry."

The balance sheet as of March 31 shows cash on hand amounting to \$436,441; total current assets, \$4,426,574, and total current liabilities \$1,915,574.

At the annual meeting, held yesterday in New York, the retiring directors were re-elected. W. H. Bronson was chosen to fill the vacancy caused by the death of Joseph Wharton.

## STATISTICS AND RETURNS.

### DOMINION COAL FIVE MONTHS' OUTPUT.

The Dominion Coal Company's output in May was 316,000 tons, against 335,000 last May. The total is behind that of a year ago.

|                    | 1909.     | 1908.     | 1907.     |
|--------------------|-----------|-----------|-----------|
| January . . . . .  | 195,971   | 312,358   | 231,606   |
| February . . . . . | 206,970   | 283,358   | 225,716   |
| March . . . . .    | 251,585   | 344,129   | 310,220   |
| April . . . . .    | 294,934   | 303,249   | 316,384   |
| May . . . . .      | 306,888   | 335,829   | 327,269   |
| Total . . . . .    | 1,263,458 | 1,578,923 | 1,411,195 |

The May output of the Nova Scotia Steel and Coal Co. was as follows:—

Collieries, Sydney No. 1, 20,731 tons; Sydney No. 2, 6,593; Sydney No. 3, 16,619; Sydney No. 4, 5,322; Sydney No. 5, 11,266. Total, 60,531 tons.

Iron, steel and coke: Pig iron, 5,780 tons; steel, 5,486; coke, 1,000.

This compares very favourably with the May output last year, which was 53,588. The gain was made notwithstanding that No. 3 was idle for seven days, while a new condensing plant as being installed. No. 5 also lost three days while a change was made to a new bankhead and new picking belts and screens were put in.

### COBALT ORE SHIPMENTS.

Following are the weekly shipments from the Cobalt Camp:—

|                            | May 22.     |
|----------------------------|-------------|
|                            | Ore in lbs. |
| Coniagas . . . . .         | 64,300      |
| Crown Reserve . . . . .    | 126,400     |
| Kerr Lake . . . . .        | 203,760     |
| King Edward . . . . .      | 43,130      |
| La Rose . . . . .          | 291,400     |
| McKinley-Darragh . . . . . | 50,670      |

|                                    |         |
|------------------------------------|---------|
| Nipissing . . . . .                | 453,860 |
| Peterson Lake . . . . .            | 67,580  |
| Right of Way . . . . .             | 249,130 |
| Temiskaming & Hudson Bay . . . . . | 60,000  |

Ore shipments to May 22, 1909, from Jan. 1, are: 22,388,023 pounds, or 11,194 tons. Total shipments for week ending May 22 are 1,610,220 pounds, or 805 tons.

|                            | May 29.     |
|----------------------------|-------------|
|                            | Ore in lbs. |
| La Rose . . . . .          | 195,680     |
| Crown Reserve . . . . .    | 161,680     |
| Nipissing . . . . .        | 194,146     |
| O'Brien . . . . .          | 128,190     |
| Temiskaming . . . . .      | 59,000      |
| Nancy Helen . . . . .      | 43,400      |
| Trethewey . . . . .        | 65,300      |
| Buffalo . . . . .          | 43,574      |
| McKinley-Darragh . . . . . | 46,780      |
| Right of Way . . . . .     | 81,228      |
| Chambers-Ferland . . . . . | 60,000      |

1,078,978

Total shipment for year, 23,467,001 pounds, or 11,733 tons.

### COBALT ORE SHIPMENTS.

Following are the weekly shipments from the Cobalt camp, and those from Jan. 1, 1909, to date:—

|                            | Since Jan. 1. |
|----------------------------|---------------|
|                            | June 5.       |
| Buffalo . . . . .          | 471,204       |
| Coniagas . . . . .         | 780,930       |
| Crown Reserve . . . . .    | 2,390,728     |
| Cobalt Central . . . . .   | 308,165       |
| Chambers-Ferland . . . . . | 580,440       |
| City of Cobalt . . . . .   | 747,522       |
| Kerr Lake . . . . .        | 871,528       |
| King Edward . . . . .      | 141,160       |



|                            |         |           |
|----------------------------|---------|-----------|
| La Rose .....              | 239,128 | 5,875,926 |
| McKinley-Darragh .....     | 59,460  | 746,560   |
| Nipissing .....            | 325,715 | 5,324,109 |
| Nova Scotia .....          |         | 480,810   |
| Nancy Helen .....          |         | 480,810   |
| Nancy Helen .....          |         | 83,400    |
| Peterson Lake .....        |         | 200,540   |
| O'Brien .....              |         | 909,976   |
| Right of Way .....         |         | 1,516,030 |
| Silver Queen .....         | 127,470 | 255,335   |
| Temiskaming .....          | 60,000  | 1,292,260 |
| Trethewey .....            | 127,000 | 1,037,928 |
| T. & H. B. ....            |         | 794,800   |
| Muggley Consolidated ..... |         | 72,900    |

Ore shipments to May 29, 1909, from Jan. 1, are 24,774,572 pounds, or 12,387 tons. Total shipments for week ending June 5 are 1,307,571 pounds, or 653 tons.

#### BRITISH COLUMBIA ORE SHIPMENTS.

The output at the mines for the week ending May 22 has been slightly under the average. The following are the details:

##### Boundary.

|                   | Week.  | Year.   |
|-------------------|--------|---------|
| Granby .....      | 17,495 | 378,049 |
| Snowshoe .....    | 1,410  | 44,342  |
| Other mines ..... |        | 140,871 |
| Total .....       | 18,905 | 563,262 |

##### Rossland.

|                             |       |        |
|-----------------------------|-------|--------|
| Centre Star .....           | 3,302 | 62,343 |
| Le Roi No. 2 .....          | 617   | 12,251 |
| Le Roi No. 2 (milled) ..... | 260   | 5,040  |
| Other mines .....           |       | 9,409  |
| Total .....                 | 4,179 | 89,043 |

##### Slocan-Kootenay.

|                                |       |        |
|--------------------------------|-------|--------|
| Queen (milled) .....           | 420   | 8,190  |
| Granite-Poorman (milled) ..... | 250   | 4,850  |
| Whitewater Deep (milled) ..... | 700   | 13,800 |
| Kootenay Belle (milled) .....  | 70    | 1,370  |
| Second Relief (milled) .....   | 145   | 2,830  |
| Nugget (milled) .....          | 110   | 2,150  |
| Bluebell (milled) .....        | 900   | 17,600 |
| Lucky Jim .....                | 154   | 488    |
| Whitewater Deep .....          | 150   | 1,324  |
| Bluebell .....                 | 139   | 1,985  |
| Silver King .....              | 159   | 1,657  |
| Van Roi .....                  | 61    | 141    |
| Richmond-Eureka .....          | 100   | 1,441  |
| St. Eugene .....               | 494   | 7,305  |
| Yankee Girl .....              | 36    | 339    |
| Other mines .....              |       | 5,722  |
| Total .....                    | 3,888 | 71,192 |

The total shipments for the week were 26,972 tons, and for the year to date, 723,497 tons.

#### SMELTER RECEIPTS.

|                                   | Week.  | Year.   |
|-----------------------------------|--------|---------|
| Granby, Grand Forks .....         | 17,495 | 378,319 |
| Consolidated, Trail .....         | 6,352  | 138,657 |
| B. C. Copper Co., Greenwood ..... |        | 140,505 |
| Le Roi, Northport .....           |        | 12,761  |
| Total .....                       | 23,847 | 670,242 |

#### BRITISH COLUMBIA ORE SHIPMENTS.

For the week ending May 29 the following ore shipments are reported:—

##### Boundary.

|                   | Week.  | Year.   |
|-------------------|--------|---------|
| Granby .....      | 18,377 | 396,426 |
| Snowshoe .....    | 2,895  | 47,237  |
| Other mines ..... |        | 140,871 |
| Total .....       | 21,272 | 584,534 |

##### Rossland.

|                             |       |        |
|-----------------------------|-------|--------|
| Centre Star .....           | 3,559 | 65,902 |
| Le Roi No. 2 .....          | 261   | 12,512 |
| Le Roi No. 2 (milled) ..... | 260   | 5,300  |
| Other mines .....           |       | 9,409  |
| Total .....                 | 4,080 | 93,123 |

##### Slocan-Kootenay.

|                                |       |        |
|--------------------------------|-------|--------|
| Queen (milled) .....           | 420   | 8,610  |
| Granite-Poorman .....          | 250   | 5,100  |
| Whitewater Deep (milled) ..... | 700   | 14,500 |
| Kootenay Belle (milled) .....  | 70    | 1,440  |
| Second Relief (milled) .....   | 145   | 2,975  |
| Nugget (milled) .....          | 110   | 2,200  |
| Bluebell (milled) .....        | 900   | 18,500 |
| Bounty .....                   | 18    | 44     |
| Van Roi .....                  | 66    | 207    |
| Granite-Poorman .....          | 88    | 197    |
| Bluebell .....                 | 89    | 2,174  |
| Richmond-Eureka .....          | 202   | 1,643  |
| St. Eugene .....               | 82    | 7,587  |
| Yankee Girl .....              | 107   | 446    |
| Queen .....                    | 49    | 215    |
| Nugget .....                   | 15    | 872    |
| Silver King .....              | 39    | 1,696  |
| Keystone .....                 | 35    | 35     |
| Rambler-Cariboo .....          | 21    | 350    |
| Whitewater Deep .....          | 177   | 1,501  |
| Other mines .....              |       | 5,223  |
| Total .....                    | 3,743 | 75,075 |

The total shipments for the week were 29,353 tons, and for the year to date 752,732 tons.

#### SMELTER RECEIPTS.

|                               | Week.  | Year.   |
|-------------------------------|--------|---------|
| Granby, Grand Forks .....     | 18,377 | 396,696 |
| Consolidated, Trail .....     | 7,849  | 146,616 |
| Leo Roi, Northport .....      |        | 12,761  |
| B. C. Copper, Greenwood ..... |        | 140,505 |
| Total .....                   | 26,226 | 696,578 |

The production of metals at the Consolidated Mining and Smelting Company's plant at Trail for April was \$507,068. Following are the figures in detail:—

Tons of ore received during the month of April ..... 35,590  
Tons of ore smelter during the month of April ..... 35,490  
from which were produced 410 tons of copper matte and 2,264 tons of lead bullion, containing:—

|              |           |
|--------------|-----------|
| Gold .....   | \$214,835 |
| Silver ..... | 101,891   |
| Copper ..... | 44,232    |
| Lead .....   | 146,110   |

Total gross production for April ..... \$507,068.

During April the refinery produced: Tons of pig lead, 2,012, valued at \$115,927; ounces fine gold, 2,663, valued at \$54,959; ounces fine silver, 148,128, valued at \$75,485. Total, \$246,371.

For the year beginning June 30th, and up to April 30th, the metals produced are valued at \$4,088,940, of which the refinery has produced \$2,096,461.

### TORONTO MARKETS.

**Metals**—June 8.—(Quotations from Canada Metal Co., Toronto):

Spelter, 5½ to 5¾ cents per lb.

Lead, 3½ cents per lb.

Antimony, 10 cents per lb.

Tin, 31 cents per lb.

**Copper**—

Casting, 14 cents per lb.

Electrolytic, 14½ cents per lb.

Lake, 14¾ cents per lb.

**Ingot brass**, 12 to 14 cents per lb.

**Coal**—

Anthracite, \$5.50 to \$6.75.

Bituminous, \$3.50 to \$4.50 for 1¼ inch lump.

**Pig Iron**—June 8.—(Quotations from Drummond, McCall & Co.)—

Summerlee No. 1, \$21.75 (f.o.b. Toronto).

Summerlee No. 2, \$21.25 (f.o.b. Toronto).

Midland No. 1, \$17.75 to \$18 (f.o.b. Midland).

An upward tendency is apparent in the iron market.

|      |         |     |         |
|------|---------|-----|---------|
| "    | 26..... | 52¾ | 24¼     |
| "    | 27..... | 52½ | 24½     |
| "    | 29..... | 53  | 24¾     |
| June | 1.....  | 53  | 24¾     |
| "    | 2.....  | 52¾ | 25 5-16 |
| "    | 3.....  | 52¾ | 24¼     |
| "    | 4.....  | 53  | 24¾     |

### MARKET REPORTS.

#### Metals.

June 4.—Connellsville coke, f.o.b. ovens:—

Furnace coke, prompt, ———

Foundry coke, prompt, ———

#### Metals.

June 4.—Tin, Straits, 29.30 cents.

Copper, prime Lake, 13.65 cents.

Electrolytic copper, 13.45 cents.

Copper wire, 14.50 cents.

Lead, 4.35 to 4.40 cents.

Spelter, 5.30 cents.

Sheet zinc, 7.25 cents.

Antimony, Cookson's, 8.25 cents.

Aluminium, 22 to 24 cents.

Nickel, 40 to 47 cents.

Platinum, \$22.50 to \$23.50 per ounce.

Bismuth, \$1.75 per lb.

Quicksilver, \$44.50 to \$45 per 75-lb. flask.

### Silver Prices.

|     |         |     |         |
|-----|---------|-----|---------|
| May | 20..... | 52¾ | 24 5-16 |
| "   | 21..... | 52¾ | 24¼     |
| "   | 22..... | 52½ | 24½     |
| "   | 24..... | 52¾ | 24 3-16 |
| "   | 25..... | 52¾ | 24¼     |

### MARKET NOTES.

During the month of May, business in copper expanded largely. An advance of half a cent per pound has marked New York transactions, and a corresponding advance of £3 10s. per ton was recorded in London. Surplus stocks are being touched more substantially than has been the case for some time.

### MARKET NOTES.

The following table shows the opening, highest, lowest, closing and average prices for the month of May, 1909:—

| Domestic—                                   | Opening. | Highest. | Lowest. | Closing. | Average. |
|---------------------------------------------|----------|----------|---------|----------|----------|
| Pig tin (Straits), f.o.b. New York .....    | 28.85    | 29.60    | 28.85   | 29.00    | 29.16    |
| Lake copper, f.o.b. New York .....          | 13.00    | 13.50    | 13.00   | 13.50    | 13.28    |
| Electrolytic copper, f.o.b. New York .....  | 12.70    | 13.25    | 12.70   | 13.25    | 13.02½   |
| Casting copper, f.o.b. New York .....       | 12.60    | 13.12½   | 12.60   | 13.12½   | 12.87    |
| Pig lead, f.o.b. New York .....             | 4.21½    | 4.40     | 4.20    | 4.37½    | 4.31     |
| Spelter, f.o.b. New York .....              | 5.02½    | 5.25     | 5.00    | 5.25     | 5.09½    |
| Pig lead, f.o.b. St. Louis .....            | 4.10     | 4.32½    | 4.10    | 4.27½    | 4.22     |
| Spelter, f.o.b. St. Louis .....             | 4.90     | 5.15     | 4.90    | 5.15     | 4.98     |
| Antimony (Cookson's), f.o.b. New York ..... | 8.25     | 8.25     | 8.25    | 8.25     | 8.25     |
| Antimony (Hallett's), f.o.b. New York ..... | 7.75     | 7.75     | 7.75    | 7.75     | 7.75     |



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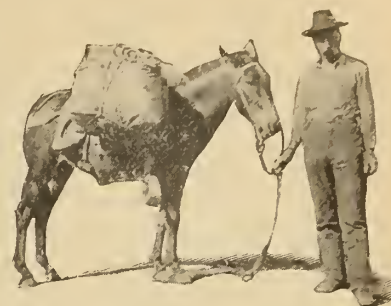
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AND THE DRILL

## Lasts Longer.

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CANADIAN RAND CO., Cobalt.

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ANGEL ENGINEERING & SUPPLY Co.  
St. John, Nfld.

Canadian Representative

D. W. CLARK, P.O., Box 521, Toronto.

# DOMINION



# OF CANADA

## Synopsis of Canadian North-West Mining Regulations

**COAL**—Coal mining rights may be leased for a period of 21 years at an annual rental of \$1 per acre. Not more than 2,560 acres shall be leased to one individual or company. A royalty at the rate of five cents per ton shall be collected on the merchantable coal mined.

**QUARTZ**—A person 18 years of age, or over, having discovered mineral in place may locate a claim 1,500 x 1,500 feet.

The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year, or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey made, and upon complying with other requirements, purchase the land at \$1 per acre.

The patent provides for the payment of a royalty of 2½ per cent. on the sales.

Placer mining claims generally are 100 feet square; entry fee \$5, renewable yearly.

An applicant may obtain two leases to dredge for gold of five miles each for a term of twenty years, renewable at the discretion of the Minister of the Interior.

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles. Rental \$10 per annum for each mile of river leased. Royalty at the rate of 2½ per cent. collected on the output after it exceeds \$10,000.

W. W. CORY, Deputy of the Minister of the Interior

N. B.—Unauthorized publication of this advertisement will not be paid for.

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# The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch. If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertiser kindly mention this Journal.

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Allis-Chalmers-Bullock.  
Sullivan Machinery Co.  
Walker Bros., Limited.  
Canadian Rand Drill, Ltd.  
John McDougall Caledonia Iron Works.

Peacock Bros.  
A. R. Williams Machinery Co.  
N. J. Holden Co.  
Laurie & Lamb.

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Peacock Bros.

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Drummond, McCall & Co.

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Jeffrey Mfg. Co.  
A. R. Williams Machinery Co.  
Link Belt Co.  
Watrous Engine Works.

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A. M. Ellicott Co.

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Watrous Engine Works.  
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P.O. BOX  
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Manufacturers of

## Steel Castings

(Acid Open Hearth System)

## Switches and Track Work

for Steam and Electric Roads

## Springs

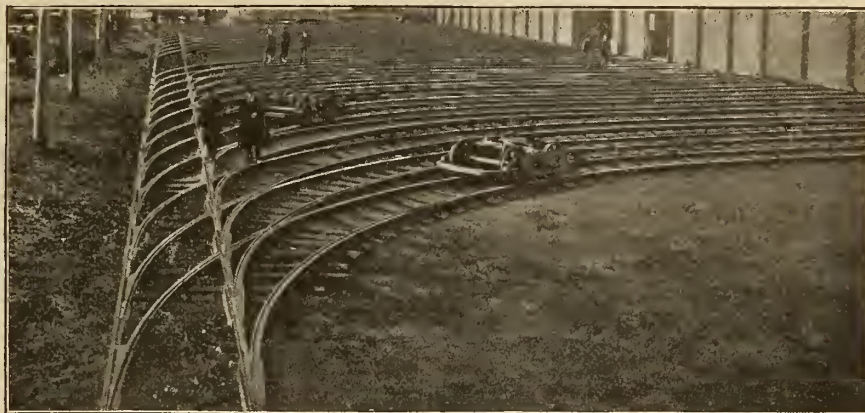
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## Manganese Steel Castings

for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS

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'Speedicut' High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

**BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND**

Quotations for Tee Rails, Fish Plates, etc., promptly furnished.

Catalogues sent on application.

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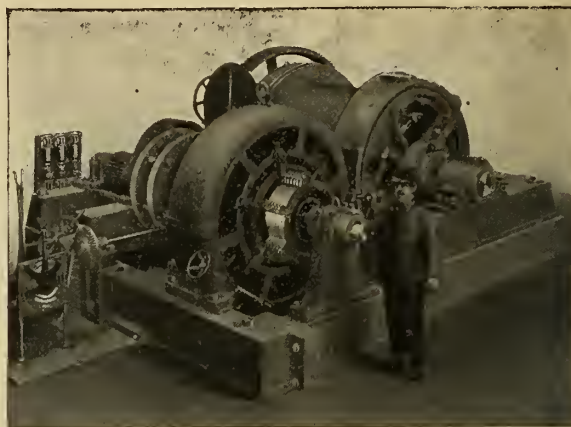
A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway  
MONCTON, N.B.

# Westinghouse Motors for Mines

**Our line of Motors and Controllers for driving Mine Hoists is complete.**

Whether intended for alternating or direct current service, and no matter what the conditions to be met, we have just the right motor and just the right controller to operate it. Don't bother about your hoisting problems, let our engineers solve them for you.



500 H. P. Westinghouse Motor with automatic control driving a Mine Hoist installed 800 feet below the surface.

## Canadian Westinghouse Co., Limited

**General Office and Works, HAMILTON, ONTARIO.**

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VANCOUVER.

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## HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal  
MANUFACTURERS OF

**High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.  
Safety Fuse, Electrical Fuses, Batteries, and other Accessories.**

### NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

### "WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. It does not freeze, or rather, explodes with perfect efficiency when frozen and needs no thawing.

### "AUTUMN BRAND" DYNAMITE

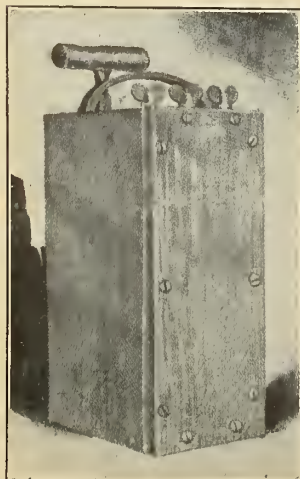
Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

### PERMITTED EXPLOSIVES for Coal Mines

**Nobel Monobel, Saxonite and Carbonite.**

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COBALT      TORONTO      KENORA      WINNIPEG, MAN.  
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Three Post Magneto Electric Blasting Machine

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# THE FINEST MINERS' TOOLS



THE "UNIVERSAL."

ARE  
"HARDY'S"

INTERCHANGEABLE

"Universal" Picks

They cut more Coal in less Time than any others  
and last longer

SHEFFIELD STEEL THROUGHOUT  
"ELLIOTT" & "RATCHET"

POST and BARREL  
BORING MACHINES

For HAND POWER, for ROCK and COAL  
Fitted with Quick-Change Nuts and Automatic Feed

**The HARDY PATENT PICK CO., Ltd.**  
**SHEFFIELD, ENGLAND**

Stocks of our Universal Picks and Headed Shafts kept by Messrs. Mussens Ltd.,  
299 St. James Street, Montreal.

# The "CLEVELAND" A One-Man Stope Drill

If you are doing any stoping or up-raising it will pay you to use a "Cleveland." To prove this we will ship you an equipment complete so that you can prove to your own satisfaction that it

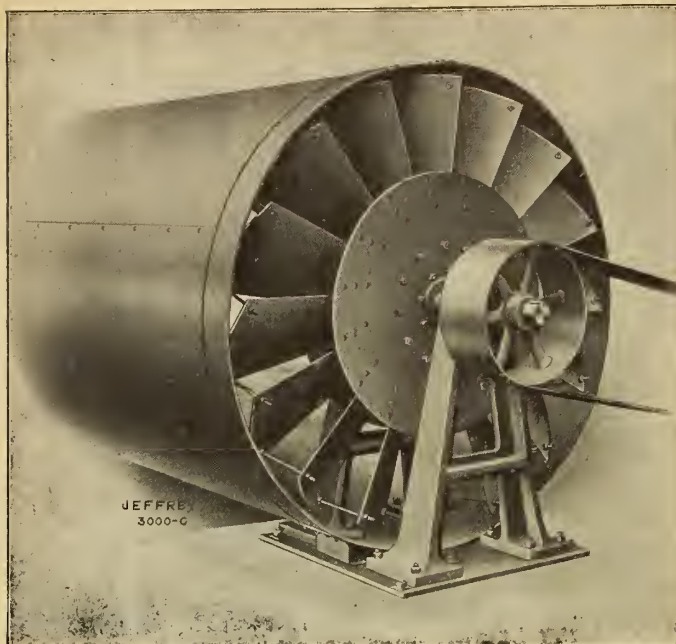
**SAVES TIME, LABOR,  
POWER and POWDER**

We offer you a simple, durable, "fool-proof" machine, which we will guarantee will do more work than any similar machine on the market at less cost for maintenance.

WRITE TO-DAY FOR BULLETIN No. 40.

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Cobalt, Ontario.

ROCK DRILLS, PNEUMATIC TOOLS, HOSE, DRILL STEEL, ETC.



## Jeffrey Propeller Fan for Mine Ventilation

This fan is highly recommended wherever the development does not justify the installation of our centrifugal fan.

It has no equal for boosting along feeble currents in large operations.

### A DISTINCT IMPROVEMENT OVER THE ORDINARY DISC FAN

It is self contained, simple in operation and embodies many new features which are described in our Bulletin X23, mailed on request.

We Build

COMPLETE COAL MINE AND TIPPLE EQUIPMENTS

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attain their superior cutting capacity and economy by means of a positive valve motion, operated from the piston. This device secures a hard blow with slow recovery, enabling each stroke to be placed at the proper spot. An air cushion prevents waste when running off the coal.

Runners prefer Sullivan Punchers because the positive valve aids them in handling the machine.

Send for a comparison of the cost of hand vs. machine mining, Catalog No. 657.



Compressed Air and Electric Longwall and Room Chain Coal Cutters, Mine Fans, Car Dumps, Air Compressors, Diamond Drills, Rock Drills, Hammer Drills, Mine Hoists.

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RAILWAY EXCHANGE  
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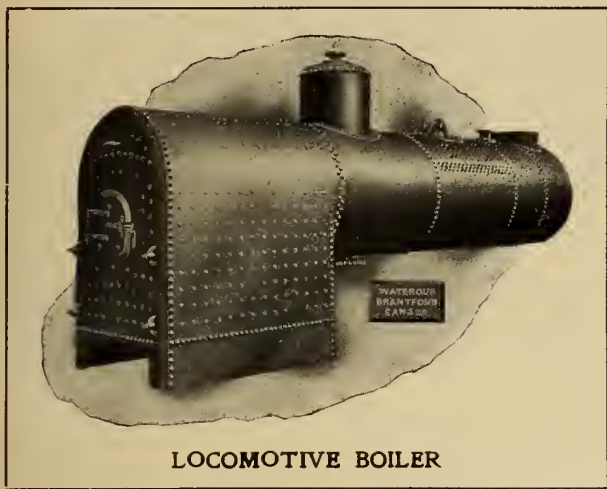
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# Locomotive and Stationary Tubular Boilers

IN STOCK—FOR IMMEDIATE SHIPMENT



LOCOMOTIVE BOILER

## LOCOMOTIVE

30—40—50—60 H. P.

## TUBULAR BOILERS

72" x 18'—66" x 16'—60" x 14'—48" x 14'

**1 HOISTING ENGINE**, double cylinder, double drum, only used two weeks, thoroughly overhauled, cheap.

**SHEET IRON and TANK WORK, AIR RECEIVERS, HEATERS, ENGINES, ROCK CRUSHERS, Etc.**

Inquiries Solicited.

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"Little Giant"

## Rock Drills

☐ Built in sizes ranging from 2" to 5½" Cylinder diameter, for all work from boulder breaking to submarine drilling.

☐ Our claim that the Rand drill is the best in the market is proven by the sale of more of this type than of all other makes combined.

☐ Prices and catalog on request, or ask to have one of our representatives call.

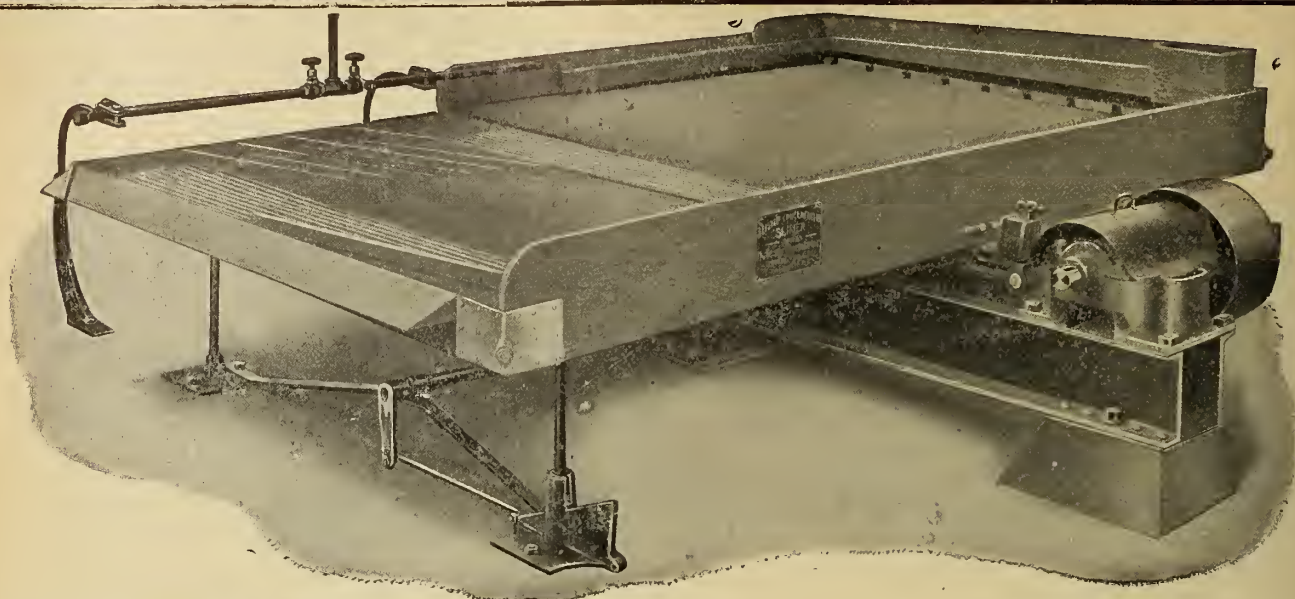
## CANADIAN RAND CO., LIMITED

Montreal, Canada

TORONTO, COBALT, HALIFAX, WINNIPEG, ROSSLAND, MONTREAL.

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### What a User says of the Deister:

I have yours of the 7th inst and am pleased to advise you that the results obtained at our Calvario mill with the Deister No. 3 Concentrating tables under my personal observation in treating the ores from the Carboncillo mine were not only satisfactory but have made it possible for us to treat one of our low grade ores at a good profit which heretofore could not be treated except at a loss. Ours is a gold-silver ore which was given to your table through an 80-mesh screen at the rate of about 12 tons per 24 hours. The table requires but very little attention and from our experience I am convinced that there is no machine now in use which could give us the results obtained. Neg. Minera "El Carboncillo y Anexas, S. A.," Zacualpam, Mexico. Yours truly, (Signed) A. C. Chabaud, Mgr.

**EMIL DEISTER,**

**Fort Wayne, Indiana**

## The Canadian Bank of Commerce

HEAD OFFICE - - - - - TORONTO  
ESTABLISHED, 1867

B. E. WALKER, C.V.O., LL.D.,  
President

A. LAIRD,  
General Manager

PAID-UP CAPITAL \$10,000,000

REST \$6,000,000

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The new Travellers' Cheques recently issued by this Bank are a most convenient form in which to carry money when travelling. They are issued in denominations of

**\$10, \$20, \$50, \$100 and \$200**

and the exact amount payable in **Austria, Belgium, Denmark, France, Germany, Great Britain, Holland, Italy, Norway, Russia, Sweden and Switzerland** is stated on the face of each cheque, while in other countries they are payable at current rates.

The cheques and all information regarding them may be obtained at every office of the Bank.

Branches at **Cobalt, Elk Lake, Cowganda, and Latchford** in the silver mining camp of New Ontario and throughout Canada; also in the United States and England.

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Chemical and Physical tests  
of all Materials.

Mining properties examined  
and reported upon.

Write for prices for  
Ore analysis.

**37 Melinda St. Toronto**



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322 Craig Street

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# The Jenckes Machine Co.

Limited

Sherbrooke, Que.

**SALES OFFICES**

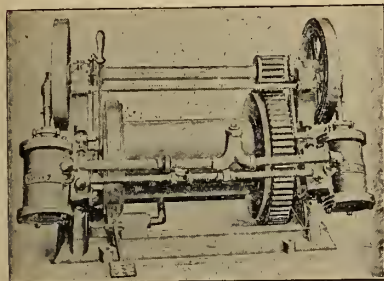
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Branch Works

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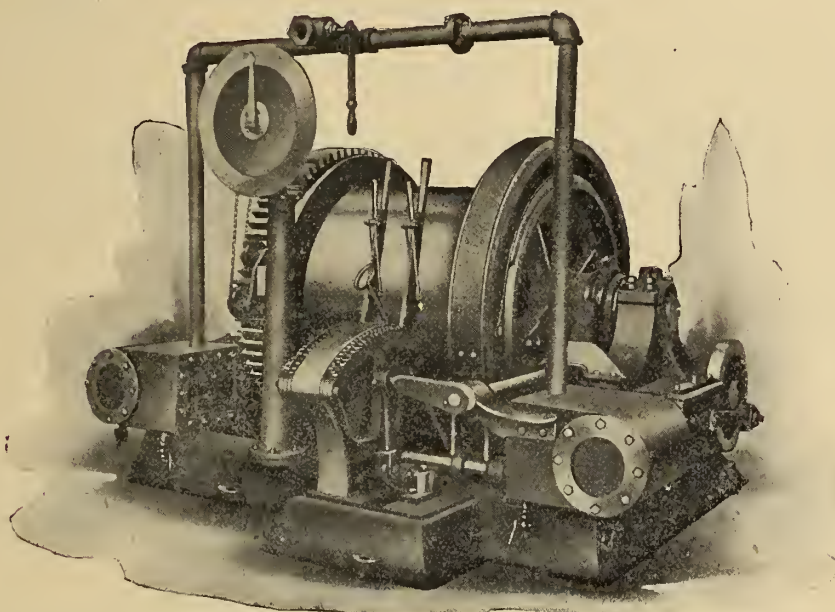
R. P. Williams

Vancouver, B. C.



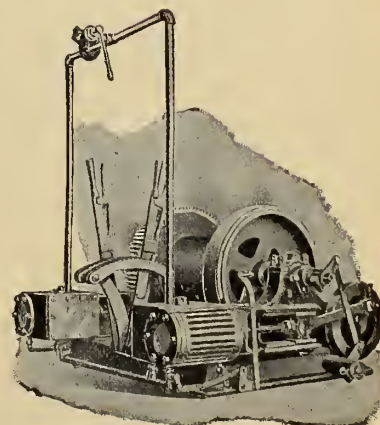
Our Double 5 for  
Prospecting

## Cobalt Hoists



Our 9x12 and 10x12. Winding Engine, Lane Friction

**We present types  
of Hoists sold to  
Cobalt Mines.**



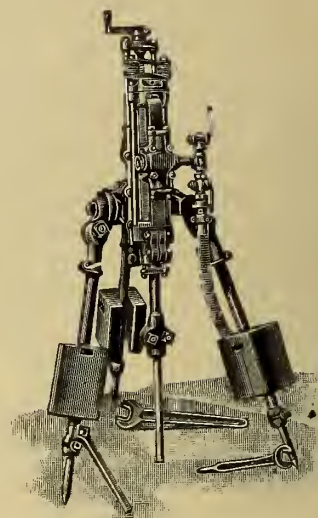
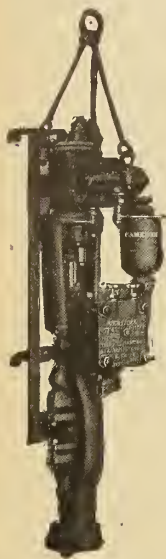
Our 6x8 for Hoisting from  
Shafts

**We Carry all Standard Sizes in Stock for Immediate Shipment.**

WRITE OR WIRE NEAREST SALES OFFICE.

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# Rock Drills, Compressors, Boilers, Hoists and Sinking Pumps



Carried in Stock at Toronto  
Both New and Second Hand  
all ready to ship

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## The A. R. Williams Machinery Co., Limited

Head Office; TORONTO, Branches: MONTREAL WINNIPEG VANCOUVER.

Manufacturers, Importers, and Dealers in all kinds of Engines, Boilers, Machinery and Supplies.

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

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CLYDE PATENT WIRE ROPE WORKS  
Rutherglen, Glasgow, Scotland

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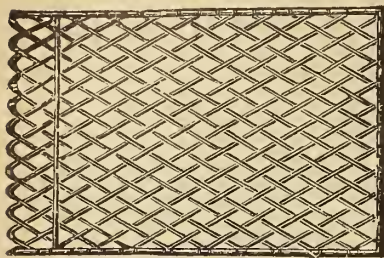
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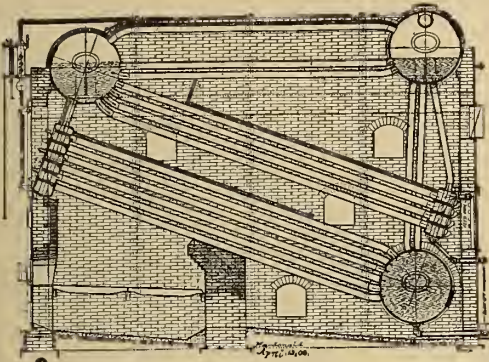
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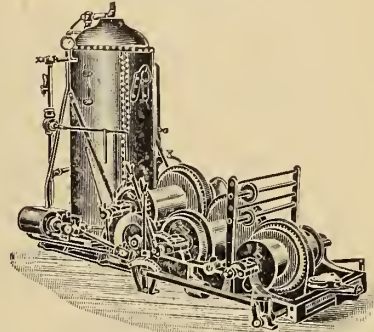
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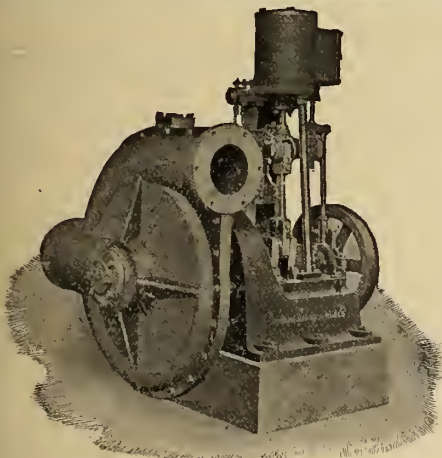
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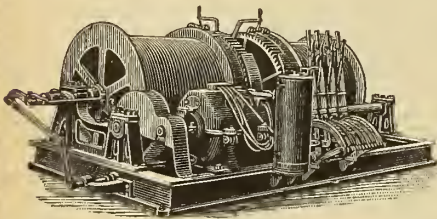
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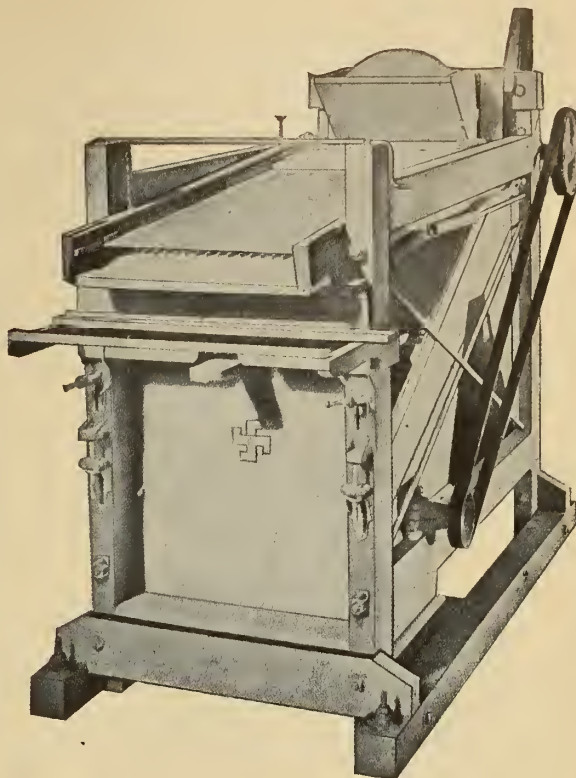
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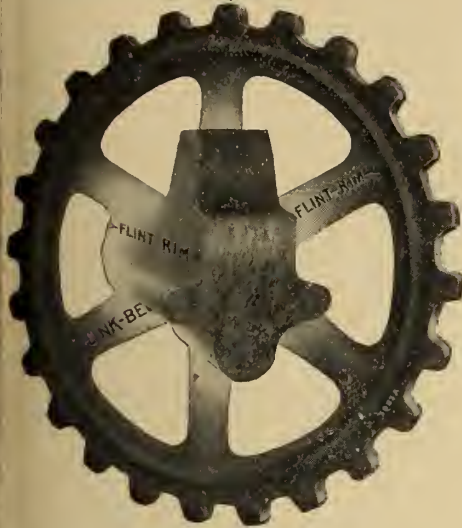
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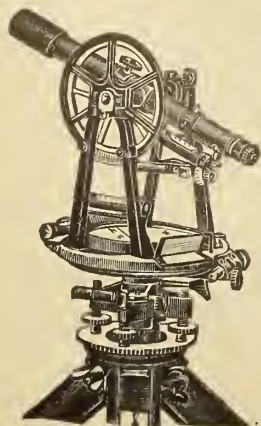
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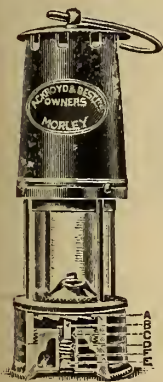
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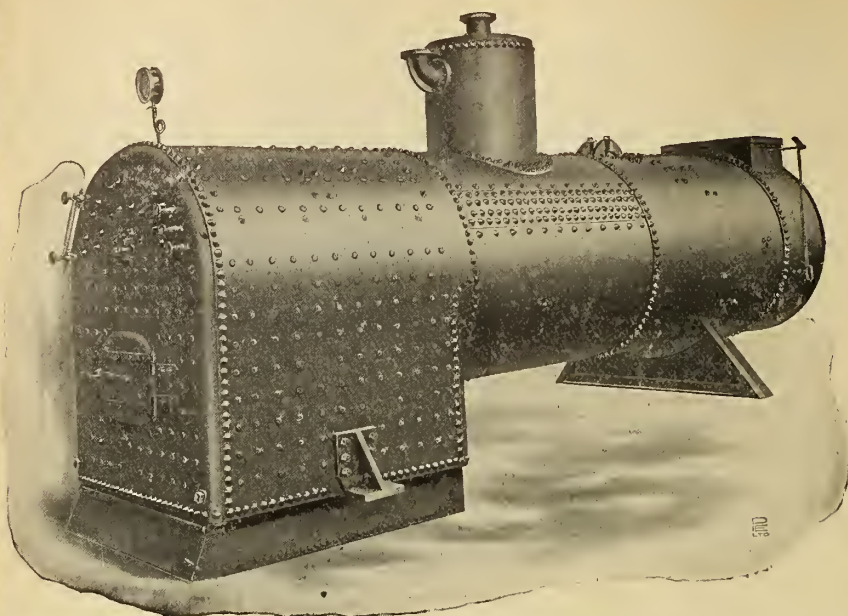
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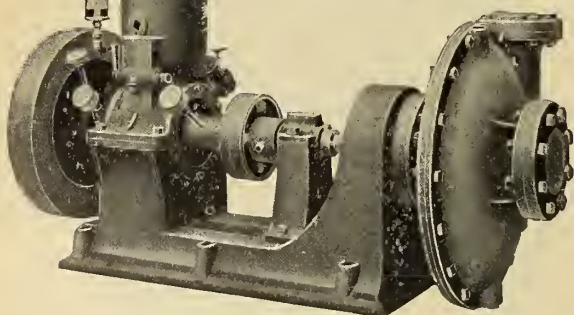
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, July 1, 1909

No. 13

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

**MINES PUBLISHING CO., LIMITED**

Head Office . . . Confederation Life Building, Toronto.

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Editor:

J. C. MURRAY, B.A., B.Sc.

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### CIRCULATION.

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"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

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## THE ASBESTOS MERGER.

The article on Amalgamated Asbestos that appeared in our issue of June 15 has aroused much comment. The Montreal newspapers, in conformity to that cheerful habit of most newspapers, have published either disconnected excerpts from the article, or have opened their columns to anonymous critics who make no possible attempt to meet the facts as presented by Mr. Harpell.

Here it may be wise to degress for a moment. In our May 1st issue we published an article outlining the scope and plans of the Amalgamated Asbestos Corporation. The material for this article was supplied by Mr. Fritz Cirkel. We accepted it without misgiving.

It is patent that if the Canadian Mining Journal is to fulfill its mission in Canada, it must publish nothing that tends to mislead or misrepresent. Our aim is, has been, and will ever be, to give the facts as we find them. Shortly after our May 1 issue appeared we received information indicating that Mr. Cirkel's data were incorrect. Immediately we took steps to get at the truth. This was set forth in Mr. Harpell's article. And that this article is correct in its details and conclusions we have daily more reason to believe. The newspaper criticisms, inasmuch as they avoid carefully all essentials, merely strengthen this impression.

These considerations lead us to another that is most vitally important. To our knowledge the promoters of the merger have based their prospectus, not upon the report of a disinterested mining engineer, but upon the statements and opinion of a man, Mr. Fritz Cirkel, who is an owner of asbestos properties himself and is interested financially in the Merger. This is contrary to the rules of decent business. It is particularly out of place in a \$25,000,000 flotation.

We do not know the precise conditions under which Mr. Cirkel is employed by the Mines Branch of the Federal Department of Mines. We believe that his contract permits him to undertake private work in addition to his official duties. But, whatever the arrangement, the position in which he has placed himself and the Department is most regrettable. In the first place, Mr. Cirkel, acting as a Government official, enjoys privileges that would by no means be his as a private individual. Secondly, his position as a Government technologist has given him, through his departmental publications, a standing that cannot be gained otherwise. Thirdly, for both these reasons very serious responsibilities have devolved upon Mr. Cirkel. It is incumbent upon him that he should, so far as possible, distinguish between his work as an employee of the public and his efforts as a private mining engineer

This Mr. Cirkel has failed to do. Not only has he failed to recognize his responsibilities, but he has used, and has permitted others to use, his official status for precisely those purposes that are most opposed to the usefulness of the Department of Mines and to the welfare of the mining industry as a whole. In lending his name, officially, to Amalgamated Asbestos, Mr. Cirkel ceased at once to merit the confidence of the Department that employs him.

It is not our intention to animadvert upon the moral phases of this incident. It suffices to say that Mr. Cirkel has been lamentably indiscreet, officially and professionally. It remains for the Minister of the Department of Mines to clear up a situation that is false and unsavoury. We have every confidence that he will do this right speedily.

### THE FORMATION OF COAL.

Two remarkable papers appear in the May bulletin of the Canadian Mining Institute. Both were read at the last Annual Meeting in Montreal.

At that meeting there was practically no opportunity for giving these papers the discussion that they fully deserved. We hope that our readers will take advantage of our columns to effect a thorough exchange of views on the vital phases touched by these two contributions to modern scientific thought.

"Some Possible Chemical Changes in the Formation of Coal" is the title of Mr. D. B. Dowling's essay. The second paper, "Petroleum and Coals," which has already been reproduced in the Canadian Mining Journal, is from the pen of Mr. Eugene Coste. We shall glance at Mr. Dowling's paper first, and then allude to a few points that connect the two.

To the application of pressure and heat upon vegetable remains we owe the substances called coal. By a series of ingeniously plotted diagrams, Mr. Dowling illustrates the successive effects, first, of the charring of wood; second, of the gradual extraction of hydrocarbon compounds from peat; third, of the extraction of carbon dioxide; fourth, of the extraction of carbon dioxide and methane in equal parts and in various combinations with ammonium; and, lastly, of the extraction of water and carbon dioxide, and of water alone.

Of all the results arrived at, that due to the extracting from peat of seven to nine parts of water and one part of carbon dioxide, appears to duplicate most closely the natural process of coal-making. To quote Mr. Dowling: "That the greater amount of the change in formation of our coals is due to the slow process of water extraction, seems evident from the fact that the ash in the coals is not increased to a very much greater extent over that for vegetable matter than this theory would allow; and, secondly, that very few geologists will allow that the vegetable remains

associated with the coals have lost a great percentage of their carbon."

Mr. Dowling's deductions throw a clear side-light upon Mr. Coste's argument for the inorganic origin of petroleum. Mr. Coste contends that the geological history of coal is known sufficiently well to leave no room for belief in the organic origin of liquid hydrocarbons. The successive steps in the formation of coal from vegetable matter have been traced and recorded. The distillation of liquid hydrocarbons from these coals implies a large loss of carbon. All available evidence proves that this is not the case. Mr. Dowling demonstrates—for according to our present knowledge his paper amounts to a demonstration—that the loss of carbon in nature's laboratory is very slight.

This is one item on the credit side of Mr. Coste's ledger. It is a significant item, as it comes from a totally independent source.

### PROSPECTING AND HOLIDAYS.

No country in the wide world affords so many clean opportunities for out-of-door holidays as does Canada. It is to be regretted that as a nation we do not use these opportunities to better advantage.

In many respects our holiday making is not only unproductive of good, but is actually a source of harmful waste. Our fatuous popular resorts and the gladiatorial games that we have copied largely from the United States, do not make for wholesome recreation.

Nothing is more noticeable than the energy with which transportation systems encourage the holiday instinct. Throughout the summer every week end is marked by the migration of hundreds and thousands of people from the crowded centres of population to suburban places of amusement, more correctly described as places of excitement. In this manner a truly enormous expenditure of money and time is incurred, mostly unprofitable, directly and indirectly, so far as the people themselves are concerned.

Suppose now that a fraction of the attention that is centred upon highly artificial forms of entertainment were diverted to the object of introducing Canadians to their unique heritage—untouched expanses of forest and prairie, threaded everywhere by noble waterways and gemmed with innumerable lakes. In other words, suppose that there came a national awakening to the need of learning more about the meaning of our undeveloped resources.

Prospecting is popularly supposed to consist in the search for the ores of valuable metals. Prospecting should be more than this. It should be the vocation of thousands of Canadian youth. Mineral veins are by no means the only or necessarily the most remunerative discoveries that the prospector may hope for. Clay deposits, marl beds, timber, farm lands, these are but a few of the objects for which the prospector may



search. And searching of this kind is work that brings its own reward whatever the tangible results may be.

Let us imagine that our railway corporations, instead of catering to the frivolous impulses of the masses and classes, were to begin a sane campaign with the object of interesting Canadians in finding out for themselves the hidden wealth of our country.

The results of such a campaign may be left to the imagination. Cheap rates for prospectors we have advocated before. This would be but an item. Should the time arrive when Canadians are fitted mentally and physically to explore our boundless stretches of unknown lands, our nations will have nothing to fear from enemies without. The vast gain in physical and moral well-being would be accompanied by an immensely increased national freight traffic. Everywhere the effect of these conditions would be reflected. Let us, then, pray for the day when our national spirit shall wake to the meaning and possibilities of prospecting.

### SAMPLING OF COBALT ORES.

Our readers will notice elsewhere in this issue an article from Dr. A. R. Ledoux on sampling Cobalt ores. Dr. Ledoux is easily pre-eminent as an authority on subjects of this kind. At our request he has embodied in this article his experience and conclusions in regard to the peculiarly difficult silver ores of Cobalt. The elaborate precautions that must be taken to ensure a fair sample are set forth. This makes impressive reading.

"In the very beginning," writes Dr. Ledoux "we learned that this ore constituted a class by itself and could not be sampled accurately by ordinary methods, due very largely to the presence of nuggets and smaller particles of native silver, and to the fact that the silver is very unevenly distributed."

The fact that Dr. Ledoux does not employ mechanical samples is a point to which we would draw special notice. The limitations of mechanical samplers are not generally known. That Cobalt silver ores may not be amenable to fair mechanical sampling, is an inference from Dr. Ledoux's article.

We invite discussion of this and other points touched upon.

### PREVENTION OF GOLD STEALING.

Steps are being taken by the Victoria (Australia) Chamber of Mines to amend the Gold Buyers' Act (1907) at present in force in that State. Preventive legislation of this kind has especial interest for Canadian mine owners. For some years Nova Scotian operators have made vain attempts to promulgate laws that will make thorny the path of the gold-stealer. Similarly, the Cobalt mine managers have tried to

tackle the task of preventing the pilfering of silver. The Department of Justice, at Ottawa, has moved slowly in the matter. But hopes are entertained that effective measures will soon be adopted.

A few notes concerning the condition of affairs in Victoria will throw useful light upon the subject. On March 2, a conference was held at Bendigo for the purpose of discussing the prevention of gold stealing. Representatives of the Mine Owners' and Mine Managers' Associations were present. So also were representatives of the labor union—the Amalgamated Miners' Association. It appears that investigation had revealed the fact that about 30,000 ounces of gold had been stolen and disposed of to buyers not identified with the regular banks. This was announced from the pulpit by a Rev. Mr. Worrall. Immediately a storm of angry protest arose. The conference was called to look further into the matter.

It was expected that the members of the Association would do all in their power to remove the cloud thus cast upon them. Strange to say they would consent to nothing except conditional co-operation. Although they recognized full well the very serious position in which their whole Association was placed by these revelations of wholesale peculation, they proffered the following bargain:

"The Miners' Association is willing to co-operate (in the prevention of gold-stealing), in the expectation that the mine owners will give preference to unionists and abolish the black list."

In other words the miners were content to permit dishonesty to flourish in their own ranks unless they could impose their own conditions on the operators.

This short-sighted policy, this willingness to sacrifice principle, is too often the sign-manual of labor organizations. Particularly is it characteristic of one body, the United Mine Workers, a United States organization that is now making desperate attempts to gain control of Canadian miners. We believe that morally and socially our Canadian labor organizations are healthier than those across the border. For this and other reasons we shall continue to oppose the encroachment of the U. M. W. upon Canadian territory.

### ONE PROSPECTUS.

The prospectus of the Northern Star Mining and Development Co., Limited, 197 Sparks Street, Ottawa, has been submitted to us. It is a thing of beauty.

The prospectus attributes to the vice-president, Mr. C. W. Willimott, experience and attainment that he does not possess. Mr. Willimott was attached to the staff of the Geological Survey for some years. The following statement is made on page 10 of the prospectus: "During the latter part of his service with the Canadian Government, all minerals brought to that office were referred to him for identification. His 38



years of experience as mineralogist on the Geological Survey has furnished him with knowledge that will be worth untold wealth to the Company."

Far be it from us to appraise Mr. Willimott's value. It is for us to contradict flatly the assertions quoted. The statement that all minerals brought to the survey were submitted to Mr. Willimott, is false. Further,

Mr. Willimott did not have 38 years' experience on the survey. He never was mineralogist, nor was he at any time a technical officer.

As Mr. Willimott's signature is attached to this document we wish to inform him that he has ample grounds for proceeding against whomsoever is responsible for subscribing his name to patent lies.

## SAMPLING OF COBALT ORES.

By Albert R. Ledoux, Ph.D.

[Editor's Note.—This article was written at the special request of the Canadian Mining Journal.]

The first carload of Cobalt ore was received at Ledoux & Company's sampling works, at the port of New York, in February, 1905, although specimens and samples had been submitted to us in January of that year. In the very beginning we learned that this ore constituted a class by itself and could not be sampled accurately by ordinary methods, due very largely to the presence of nuggets and smaller particles of native silver, and to the fact that the silver is very unevenly distributed.

In Volume X. of the Journal of the Canadian Mining Institute, appears a statement prepared by me, showing that up to that time, February, 1907, about 18 per cent. of Cobalt ores received at our sampling works had run between 1,000 and 2,000 ounces of silver per ton; 10 per cent. contained from 2,000 to 3,000 ounces; 4 per cent. from 3,000 to 4,000 ounces; 3 per cent. from 4,000 to 5,000 ounces; 17 per cent. from 100 to 200 ounces, and 11 per cent. below 100 ounces. The highest carload handled by us up to that time ran 7,402 ounces of silver per ton, and the next in grade were from 6,000 to about 7,000 ounces.

When one considers that this silver occurs largely in native form, and is an alloy with arsenic, nickel and cobalt, the difficulty of obtaining an accurate sample is manifest. We long ago discovered that to secure an accurate sample, the coarser part of the metallics had to be removed and treated separately. The method devised by us, and followed until recently, has been quite accurately described in the paper of Mr. F. F. Colcord, published in the Engineering and Mining Journal for December 22, 1906, but it may be briefly repeated as follows:

All the ore is passed through crushers and rolls in order to reduce the material as nearly as possible to one quarter inch size. Nuggets passing through the rolls, being malleable, tend to separate them, allowing some proportion of ore larger than quarter mesh to pass through. In practice, it was not found necessary to return these larger particles to the rolls, but we leave about ten per cent. of the material larger than quarter inch. The ideal preliminary crushing would be to have the whole material pass a quarter inch screen before proceeding further.

The ore passing the crusher and rolls, is piled in two parallel ridges, which we may designate as No. 1 and No. 2 by alternate shovelling to left and right. Large silver nuggets, and coarser pieces also containing silver, are picked out by hand for separate treatment. The two ridges contain substantially half a carload

each, and are shovelled together alternately into one long ridge for the purpose of mixing (ridge No. 3). This ridge is again "half shovelled" as in the beginning, to make ridges No. 4 and No. 5. No. 5 is then half-shovelled to make ridge No. 6, the alternate or rejected shovelfuls going back to ridge No. 4. Ridge No. 6, which now contains one quarter of the original carload, is half shovelled, making a pile or cone containing one-eighth of the original carload, the rejected half going back likewise to ridge No. 4. The resulting sample is coned up into what might be called pile No. 7 and quartered down to make pile No. 8, the rejected portion returning to No. 4.

Coning and quartering is then proceeded with until pile No. 9 is reached, which will weigh perhaps a thousand pounds, all the rejects having been returned in each case to ridge No. 4.

This thousand pounds, more or less is passed through a mill, including all the metallics which have remained with it. This mill grinds the material to about one-eighth mesh, including the metallics. The material, after passing an eight-mesh screen, is turned over with shovels three times and passed through a Jones sampler, reducing it to about 40 pounds, the rejects again returning to ridge No. 4.

This 40 pounds, which now constitutes the twelfth stage of sampling, is ground through a mill until it will pass a 20-mesh screen, thoroughly mixed and again divided into two parts, one of which is temporarily held at the works, in case of need, and the other sent to the laboratory.

In the laboratory, the sample is reground and sub-divided to a sample of about five pounds weight. After weighing this, it is ground in a pebble mill until it will pass a 100-mesh screen. The metallics which cannot be finely ground, are left on this screen, then weighed and suitably sub-divided to make final samples. The fines passing the 100-mesh screen are mixed and also sub-divided into several parcels, corresponding with the metallics. The final samples each consist of two parcels, one contains the metallics, the other the fines. The weights of fines and the weights of metallics from the five pound sample, are recorded on each package, so that the final assays may be calculated.

The rejects, forming ridge No. 4, represent every portion of the original carload except the negligible 40 pounds taken for a sample. The second sampling proceeds as before and finally a third sampling, and a fourth, so that four samples are taken from each carload, differing in no respect from one another, excepting that each one is taken from a bulk of a few pounds less in weight than the preceding samples.



That the average assay of the four samples accurately represents the lot, has been proved again and again by the reasonable concurrence of the assay result, as for example, in three lots:

|                      |         |         |         |
|----------------------|---------|---------|---------|
| First sampling.....  | 3840.00 | 3765.80 | 5090.10 |
| Second sampling..... | 3822.80 | 3696.60 | 5119.60 |
| Third sampling.....  | 3829.60 | 3703.80 | 5121.60 |
| Fourth sampling..... | 3644.10 | 3729.90 | 5130.40 |

The metallies, which have been obtained by hand-picking the larger pieces of silver from the original lot before sampling, are weighed and handled separately as bullion. They do not constitute part of the sample taken from the crushed ore, but are melted and treated separately.

The sampling at our works is usually performed in the presence of representatives of buyers and sellers, and the former, especially, are men of long experience in the handling of ores, both at western sampling works and smelters in the east.

Suggestions have been made to us from time to time as to what might improve the process in the direction of accuracy, and in some cases, the not unnatural question has been asked why we do not employ mechanical sampling from beginning to end, if for no other reason than that it is cheaper than hand labor. Such mechanical sampling has been installed at Copper Cliff, as is well known, and the methods and results are well described in the Journal of the Canadian Mining Institute for 1908, in a paper prepared by Mr. Arthur A. Cole, of Cobalt. Mechanical sampling is likewise employed on Cobalt ores at Deloro and at Denver. In the sampling of ordinary ores, mechanical sampling long ago superseded hand sampling in all progressive works, both east and west, but there seems to be some question in the minds of assayers and others interested, as to whether the mechanical sampling produces as uniform results in Cobalt ores as does the method of shovelling into ridges and cones, as outlined above. If there be anything in the belief that mechanical sampling is not quite the equal of hand sampling on this ore, it rises from two causes:

One, the possibility that in grinding in a Ball mill or other similar device, there may be a mechanical concentration in the mill, rendering it difficult to get samples which do not show too high or too low a proportion of silver; and to another cause: that automatic sampling devices, cutting out a fraction of the lot, which is subsequently sampled down by any method, do not admit of taking more than one sample of the "whole" lot, starting practically from the beginning each time. The assumption is that the fraction taken mechanically must accurately represent the whole. In many works, mechanical samplers are set to take out one-tenth, and from two to four samples of this tenth are subsequently cut out for duplicate or quadruplicate assays, but by the slower and more tedious hand sampling, four "original" samples may be taken, starting in each case from the beginning.

Without going into all the reasons for such changes as from time to time have been introduced by Ledoux & Co., I would say that our present practice is substantially as follows, and details omitted being evident from what has preceded:

The material after being unloaded, is put through a Blake crusher, crushing the ore to about one and one-fourth inches in size. From there it runs down a chute into an elevator boot, the buckets raising and

throwing the ore into a one-inch revolving screen and passing through this into an outer screen of one-half inch holes. All that passes through this screen drops into a chute and is ready for the floor. The material not passing through this half-inch screen, together with all which has passed through the one-inch, slides through a chute into the rolls, which are set to one-fourth inch; all material not passing through the one-inch screen passes down a chute to a crusher, thence back to the elevator and so on, until all the material has been crushed and passed through the rolls. The ore after leaving the rolls, is wheeled with barrows onto the sampling floor, and put into two ridges, alternating each barrow, one to the right and the other to the left, then screened through a half-inch mesh, and all the metallies which do not pass the half-inch screen, are picked out and treated separately. Men are then placed at each ridge opposite each other, shovelling the material into one ridge.

The ore is then half-shovelled by throwing one shovelful to the right for one ridge and the other to the left for the other ridge. After dividing into two ridges, each ridge is again divided by half-shovelling to about two tons, which is coned and quartered down to about one thousand pounds remaining, and put through the rolls and mills until all the material, including the metallies, will pass through an eight-mesh screen. This is then mixed by shovelling over three different times, then put through a Jones sampler and worked down to about 35 or 40 pounds, which is put through a Hance Brothers & White drug mill and ground to pass through a 20-mesh sieve. This is sent to the laboratory and treated as described above.

It will be seen that in the second method of sampling the ore after crushing is thoroughly mixed and then divided into four lots or parcels, each of which should be exactly like the others. Each of these four lots or samples is then worked down separately, and the average of the assays of the four lots is taken as representing the carload. The reasonable concordance of the four samples is shown by the following examples, on two lots:

#### Ounces of Silver per Ton.

|                      |         |         |
|----------------------|---------|---------|
| First sampling.....  | 3956.80 | 3001.10 |
| Second sampling..... | 3965.10 | 2968.80 |
| Third sampling.....  | 3980.90 | 2954.70 |
| Fourth sampling..... | 3950.40 | 2982.00 |

### NEW ZEALAND GEOLOGY.

Under the energetic management of Dr. J. M. Bell, director of the New Zealand Geological Survey, the geology of that country is receiving much more systematic attention than ever before. A new series of elaborate bulletins is being brought out, covering gradually the whole dominion. Bulletin No. 7, "The Geology of the Queenstown Subdivision, Western Otago," has just been received. In this, Mr. James Park, Professor of Applied Geology at the University of Otago, outlines the geology of the Queenstown subdivision. The report contains 112 pages of letterpress, 38 plates, 33 illustrations, and 13 maps.

In glancing over Mr. Park's notes on the economical geology of the Queenstown region, several interesting features are noticed.

The most productive gold-bearing lodes of the Mace-town district are enclosed in a comparatively soft, grey,



silky mica-schist. The gold occurs in shoots of quartz, the remainder of the lode being filled with crushed country rock. The veins are fissures with well-defined walls, the hanging wall being the more regular. The ore is free-milling, carrying varying amounts of pyrite and mispickel. The pyrite may be either barren or gold-bearing. The tendency of the lodes is to come together at depth. Where horses of country rock (locally

called "mullock") are encountered in a lode, they occasionally show small veins or stringers of quartz of considerable richness. Occasionally, also, there are small veins of quartz running into the country rock.

In some places the stopes require very careful timbering; in others a very slight amount is sufficient. The stopes are generally taken out in 7-foot bunches and filled in again with waste to prevent subsidence.

## COAL MINING IN SOUTH-WESTERN VIRGINIA.

By D. A. Patterson.

[Editor's Note.—This article will be read with interest by Eastern Canadian coal producers, since it has a direct bearing upon certain questions of the day.]

Among the mountains in the western part of Virginia lies a district known as the Big Stone Gap Coal Field, which is from year to year making greater impress on the minds of those interested in the future development of the coal industry. Here, in the counties of Lee and Wise are operations building up which make abundant promise of forming a coal mining and coking centre which will equal that of the Connellsville district in Pennsylvania. It is the intention of the writer to give, at the present time, a description of one of the above-mentioned concerns, which has been constructed during the past two years, and which is equipped with all modern devices for the economic production of coal and coke.

The Keokee Coal & Coke Company, of Keokee, Virginia, is fortunate in possessing a property of 8,000 acres with seven workable seams, containing approximately 300 million tons of coal varying in thickness from 48 to 96 inches. All coal on this property dips uniformly to the northwest on a grade averaging 2 1-2 per cent., nothing greater than 3 per cent. having been encountered up to the present. On account of the high altitude (2,500 feet) and nearness to the top of the mountain range, all mines are free from excess water; one triplex electric pump discharging all water through a two-inch line. The top, for the most part hard slate, although grey sandstone has been encountered on occasions, is of such superiority that props are used only in rooms which are driven 20 feet wide. No timbering in the main headings has been necessary. Two seams are at present being mined; one known as the McConnell, and one as the Wilson seam; the first mentioned seam being a superior coal showing an analysis of—

|                    | Coal. | Coke. |
|--------------------|-------|-------|
| Moisture .....     | 3.86  | 0.69  |
| Vol. matter .....  | 34.13 | 0.93  |
| Fixed carbon ..... | 56.39 | 90.33 |
| Ash .....          | 5.62  | 8.05  |
| Sulphur .....      | .79   | .65   |

Both these seams outcrop on the sides of the mountain and consequently give opportunity for rapid development and minimum cost in operation. Mining is done on the four entry system, the two sides of the mine being kept entirely separate; and butt entries are driven right and left on 350 feet centres.

From the mines the coal is hauled by 12-ton Goodman electric locomotives over a tramroad 3,500 feet to the tippel which was designed and built by Heyl

& Patterson, of Pittsburg, Pa. The plant is electrically equipped throughout; 3 1-2 ton gathering locomotives are used for inside haulage; Goodman chain breast machines 44 inches wide and having an undercut of six feet, are used for undermining the coal, and electrically driven fans of 100,000 and 150,000 cubic feet capacity, built by Ira E. Stevens of Chicago, are used for ventilation.

The tippel contains several innovations which are of interest in that they have proved feasible. As the loaded cars from the two mines pass through the tippel at different elevations, they are dumped, two at a time without uncoupling, by rotary dumps. These dumps are a special design of the builders and are a departure in the handling of coal. Each dump consists of three cast steel rings connected by angle tie-bars. These revolve on six 16-inch cast steel wheels and are driven by a 10 h.p. motor through three spur gear reductions;



Club House and Physician's Cottage.

the master gear of the third reduction being a segmental gear attached to the central ring. The dump is started by the attendant throwing in a friction clutch and is automatically stopped at the end of each revolution. Much time is saved by this device, as coal can be loaded onto conveyors at the rate of 500 tons per hour; and the uncoupling of cars is eliminated by the use of swivel hitchings. Empty cars from the McConnell dump continue on round a spur of the mountain and return to the main line between the tippel and the mine. Return trips for the Wilson mine are switched back through the tippel behind the dump.

From the dumps the coal is deposited on pan-conveyors by means of reciprocating feeders. Coal from the McConnell Mine at higher elevation being conveyed under the Wilson dump, is kept separate from the Wilson coal which is carried on a parallel conveyor. Both



coals proceed to the crushing and screening house, at which point they are screened either separately or together; or pass on over veil plates and another set of conveyors to be loaded as "run of mine" or screened again at the railroad tracks. The screenings are deposited in a hopper which feeds two No. 4 Williams pulverizers where the coal is crushed for coking purposes.



Coke Drawing Machine.

poses and carried by belt conveyors to a bin having a capacity of 1,400 tons. The disintegrated coal is evenly distributed throughout the bin by a continuous running, automatic reversing, tripper, when desired run-of-mine coal may be unloaded from the first conveyors into a Heyl & Patterson breaker which passes the broken coal to the pulverizers for further disintegration. The tippie is designed to handle 5,000 tons of coal per day; the present output being 1,400 tons per day of ten hours.

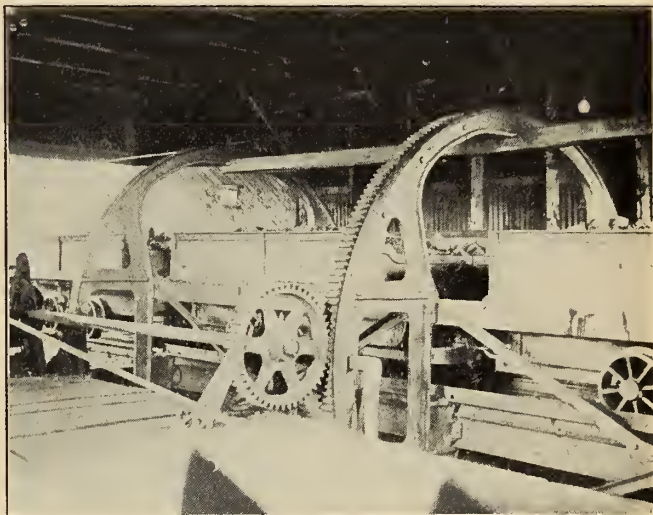


Coal Tippie, showing elevation at which coal is dumped.

The Keokee Company has built 400 coke ovens of the "bee-hive" type. These are built in two parallel batteries of 158 ovens each, and one row of 84 bank ovens. Forty-six inch doors have been constructed to facilitate the operation of Covington coke-drawing machines. These machines do away with the laborious task of hand-drawing and, although inclined to break

the coke considerably, have advantages which more than offset the losses involved. At Keokee 40 ovens or 160 tons are drawn and loaded by each machine daily. All yard trackers are laid with No. 75 steel and built on a 1.25 per cent. grade, making it possible to place empty cars under the conveyors of the coke machines without the aid of a locomotive. For haulage the company have one 60-ton Baldwin locomotive.

Behind, and adjacent to, the bank ovens a large gas flue has been built. This collects all waste gases from these ovens and is constructed of three layers of brick, one silica, one fire, and one red. The gas, coming through connecting flues from the ovens, is utilized for steam purposes and after passing through the main flue goes under the fire boxes of the boilers and up behind the bridge walls; thus preventing any injurious effect of the gases on the grate bars. The boilers, of which there are four Wickes vertical, developing 300 h.p. each have the usual fire boxes so that they can be fired by coal, if necessary; but with the collected gases from 39 ovens, burning 48 hour coke, this has been found unnecessary. The supply of heat is regulated by water-cooled dampers placed in front of the fire doors. These



Rotary Dump, showing cars in position for dumping.

are operated by hydraulic pressure obtained from the feed pumps. Further information relative to the effectiveness of the above utilization of waste gases can be obtained later, as extensive tests are being made at Keokee by the Wickes Bros. Boiler Company. It is sufficient to say that there is a saving of from 25 to 30 tons of coal per day of 24 hours.

The power house, built of grey sandstone, with composition roof, is equipped with two 300 k.w. 250-volt Goodman generators driven directly by McEwen tandem compound engines which have given admirable service during the past year. An Ingersoll-Rand air compressor has also been installed to furnish power for air-lift wells, and one Latta-Martin displacement pump. All waste oil from the engines is piped to a filter below the floor. A concrete tank having a capacity of 100,000 gallons has been built in the vicinity of the boilers so that a supply of water for boiler feed can always be kept on hand.

Up to the present time 190 houses have been built for the use of miners. These are of a superior type with from three to seven rooms. The valley widens at this point, giving opportunity for the construction of buildings without the usual congestion found in



mining towns. All houses have lots measuring 75 by 150 feet.

Owing to the excellent quality of the coal in the Big Stone Gap region and its adaptability to coking, the field as a whole is essentially a coke producer. The character of the coal at Keokee makes it compare favorably with the famous gas and steam coals of the Pittsburg field which have earned very high reputations in the principal markets. There is a large coal

trade in the Carolinas and Georgia, and the manufacturing industries in these states are growing rapidly. Although the market for this coal is perhaps more limited than that for coke, its excellent quality together with favorable freight rates makes it an active competitor over an area of considerable extent.

The Keokee plant has been designed and constructed under the supervision of Mr. C. P. Perin, of New York, who is president of the company.

## GOWGANDA MINING DIVISION, DISTRICT OF NIPISSING, ONTARIO.

Notes from Preliminary Report by W. H. Collins, Geological Survey of Canada.

(Continued from last issue.)

### Local Distribution.

Valuable argentiferous veins were known in 1908 only in the Gowganda district, and, so far as yet known, discoveries have been confined to the diabase west of that lake. Most of them occur in the southern portion of the central diabase strip which lies a short distance from the shore and extends northward for about seven miles from Elkhorn Lake. On one of the Mann claims (T. R. 1966), now owned by Messrs. Foster, an east and west vein averaging 4 or 5 inches in width had been traced for 300 feet, the original discovery being made in the exposed face of a low diabase wall. At its surface the vein material had been weathered out for a depth of about 15 inches, and the cavity filled by a brownish mass of the decomposed matter mixed with vegetable mould and sand. Nuggets of mossy or arborescent silver were scattered richly through this dirt, and a fairly continuous spine of the same metal, sometimes an inch thick, extended along the middle of the crevice. On the adjoining claim (T. R. 1982), a vein of massive smaltite about 1 inch wide was seen; a little silver had been found at its surface, and streaks of argentite and disseminated grains of smaltite were seen in the wall rock. Aplite dikes on another claim were found to be stained by cobalt bloom, and full of disseminated chalcopyrite.

The properties owned by Messrs. Crawford and Dobie about half a mile farther south were not visited, but were generally reported to be of about the same richness as that in T. R. 1966. Immediately north of Hangingstone Lake, Mr. F. A. McIntosh was conducting active prospecting in a coarse gabbroid, locally syenitic, form of diabase, intersected by aplite dikes. A discovery of native silver has been made since then and the property sold to Messrs. F. R. Bartlett & Co., of Toronto, together with other claims located between the northeast and northwest arms.

No silver had been obtained in the eastern diabase strip, although the geological conditions appear identical and calcite veins are abundant. An exceptionally large vein, about 18 inches wide, and traceable across two adjoining claims was seen on the property of Messrs. McLaughlin and McIntosh, about half a mile northeast of the northwest arm. Mineralization in it near the surface was very slight.

In the western strip less exploration had been performed, and little could be learned about the ore deposits. Loose pieces of native silver had been found by

W. H. Margueratt in narrow fissures on Mr. R. 1798, but the vein material was not exposed.

Out side the Gowganda area systematic prospecting was in progress at only one point—Wapus Creek. Under the management of Mr. Robert Lett a group of nine claims was being stripped and trenched, with the result that numerous calcite veins had been traced through a diabase showing the same complex intermingling of basic and acid phases and aplite dikes as at Gowganda. Chalcopyrite and cobalt bloom were abundant, and smaltite had been found as disseminations in the wall rock. Lumps of native bismuth weighing several ounces had been taken from a fissure in an aplite dike, analyses of which showed it to contain silver.

Tentative exploration was being conducted along Duncan Lake and east of Firth Lake, but not with the closeness and persistence that the topography of these veins require. In general the veins seen on Duncan Lake are exceptionally rich in quartz, and gash veins are common. Chalcopyrite, pyrite, and galena are the most noticeable metalliferous minerals, but cobalt bloom stains are frequently observable.

### Future Possibilities.

The present knowledge of the Gowganda area indicates it to be highly mineralized, at least in so far as number of veins and surface showings are concerned. The number of discoveries within its area of ten square miles is steadily increasing. The area, character of the mineral association and the richness of the surface showings are comparable with those of Cobalt. There is a general similarity in the geological conditions. The mineralized veins in Gowganda occur in the diabase, as do some of the good Cobalt veins. There are, it is true, local differences, but the resemblances are more pronounced than the differences, and lead to the hope that exploitation will reveal similar underground conditions. The well mineralized veins are sufficiently long and uniform on the surface to suggest similarly persistent vertical dimensions. Further geological work may reveal something definite concerning the character and size of the diabase bodies which form the country rock, and thus afford a basis for predicting their subterranean distribution. While there are grounds for hoping that the veins will persist in depth, this has not yet been proved, nor, if this is the case, that the mineralization and values are also persistent.

The relative importance of Gowganda is therefore a matter of uncertainty as yet, but it may be confidently



firmly that for its state of development the outlook is very favourable, and the number of veins, area of mineralization and rich surface showings afford good grounds for hoping that some at least of the veins will be found to be commercially important.

The details of igneous intrusion, differentiation and mineralization may never be sufficiently understood to allow of accurate prediction regarding the location of silver deposits, but a general conception of the sequence of events culminating in their formation does permit of the formulation of certain criteria useful in the search for ores. Evidence is accumulating to show that the silver-cobalt mineralizations in the Temiskaming region are connected with a late stage of differentiation in the magma which supplied the quartz diabase and granite. It seems reasonable, therefore, to expect ore deposits in or near such bodies, especially if they are of large size and have undergone important chemical differentiation, that is, if they contain a varied and extensive association of basic and acid phases of the diabase. Pre-existing channels to receive the mineralizers are also necessary and their distribution a matter of vital importance, but in this region they appear to have been everywhere abundant.

These conditions appear to exist quite as fully at

other foreign matter. The ore body is thought to be of vertical tabular form, occupying a fissure-like space. Its limits are not known, consequently nothing can be yet stated regarding the commercial possibility of the deposit.

Specular ore also occurs in the basal conglomerate of the Huronian series, filling the interstices between the pebbles where an original cement was deficient. At the south end of Kenisheong Lake the conglomerate appears at the water's edge, and the hematite may be observed while paddling near shore. The same thing occurs at the narrows on Duncan Lake, just south of the central expansion. In neither case is the ore in commercially valuable quantity.

**Magnetite.**—Keewatin iron formation exists about one-half mile to the northeast of Gowganda Lake. A brief visit was paid to some claims belonging to Mr. Cryderman where the formation is well exposed. The Keewatin, which is partially overlain by Huronian and traversed by diabase, consists of dark grey or black, banded chert or quartzite associated with chlorite schist. The dark bands, usually only a few inches in width, are full of disseminated magnetite grains. No concentrations were noticed, and the richest bands would probably yield less than 30 per cent. metallic iron, con-

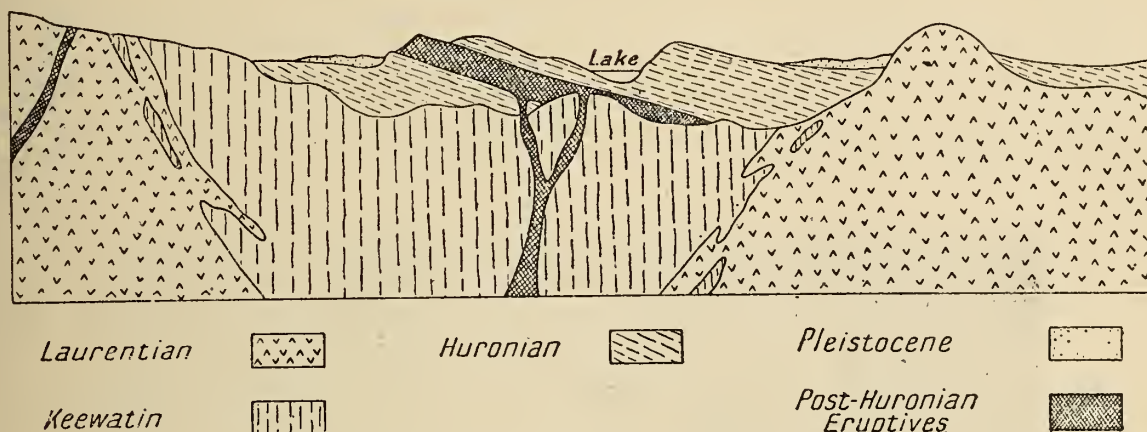


Diagram Illustrating Geological Relationships of Montreal River District.

several other localities besides Gowganda. At Wapusk Creek they seem identical and, indeed, results obtained thus far indicate that some mineralization of the silver-cobalt type exists. Between Duncan Lake and the West branch the conditions require further study, but, as now known, are not discouraging.

#### Copper.

The chalcopyrite is sometimes aggregated into bunches which yield ore specimens of such excellent appearance as to arouse interest. The ore is, however, confined to veins a few inches in width and so scattered as to render them valueless. Occurrences of this kind characterize most of the great diabase bodies, examples of which occur on Mosher Lake, between the northeast and northwest arms of Gowganda Lake and elsewhere. The chalcopyrite is sometimes superficially altered to malachite and azurite.

#### Iron Ore.

**Hematite.**—Excellent specular and kidney ore is known to exist a short distance east of Nest Lake, but the locality was not visited owing to the more urgent requirements of other portions of the district. Specimens of the ore obtained, however, proved to be of excellent character, with little admixture of silica or

sequently the present showings cannot be considered valuable.

#### Asbestos—Distribution.

In the Keewatin area between Firth and Obushkong Lakes there occur masses of a basic igneous rock through whose decomposition serpentine and asbestos have been developed. The localities given in connection with the description of the Keewatin may be briefly restated. Two bodies were found. One of these was traced for a width of four claims, but nothing learned of its north and south extent. It consists very largely of green serpentine traversed by a network of fine, white weathering veins of asbestos. More extensive outcrops exist along the east shore of Firth Lake. At somewhat more than a mile from the foot of the lake a considerable mass of partly decomposed wehrlite, serpentine, and asbestos is visible. The main mass is of dark green colour, the asbestos traversing it abundantly as a series of glistening bright green threads. The seams are small, none being found more than  $\frac{1}{4}$  inch in width, but the asbestos fibres are fine and elastic. The serpentine is often coarsely fibrous, but brittle.

#### Origin.

Microscopic examination shows the serpentine and asbestos to be the product of decomposition of the



wehrlite, a nearly black medium grained igneous type. Alteration has obscured its original character, but sufficient of the primary constituents remain to admit of its determination. It consisted of olivine, diallage, and common hornblende, with considerable ilmenite and apatite, but plagioclase is apparently absent. Hornblende and diallage form the basis of the section in which lie abundant rounded or idiomorphic grains of olivine. The latter is completely altered to a matted intergrowth of fibrous serpentine containing scattered grains of black iron ore. Diallage persists as colourless bi-refringent remnants enclosed by a felted mass of decomposition products, chiefly long scales of talc. The hornblende is fresher and strongly pleochroic, the tints being green; its alteration begins by bleaching, followed by development of colourless fibres of low bi-

refringence, possibly serpentine. Primary ilmenite is replaced by irregular patches of leucoxene, showing gridiron structure. The final product of alteration is a soft green serpentine rock composed almost wholly of that mineral.

The limits of these masses are exceedingly difficult to define, owing to the fact that they are associated with other Keewatin rock and basic forms of the post-Huronian diabase, to which it presents considerable resemblance. The asbestos actually seen is probably too short and small in amount to be valuable, but the high commercial value of this material renders delimitation of the wehrlite masses advisable. Asbestos of very good quality has been found by Mr. George Rahn in the vicinity of Sinclair Mountain, so that this mineral may be one of the district's latent resources.

## A REMARKABLE GERMAN ELECTRIC MINE HOIST.

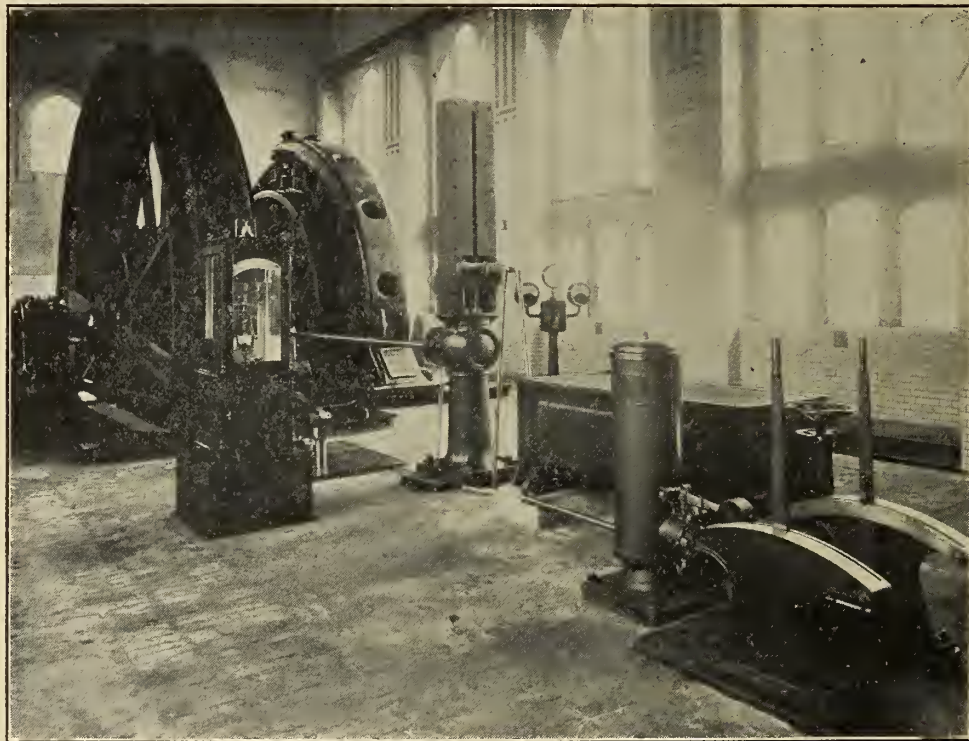
By Frank C. Perkins.

Electric hoists of enormous power are now utilized to great advantage in German mines, the accompanying illustration showing the electric winding equipment of the Mauveschacht at the Heinitz pits, near Beuthen, in Upper Silesia.

This hoisting equipment includes an electric motor of the direct current type of Brown-Boveri construc-

The Mauveschacht mine hoist was designed to raise  $7\frac{1}{4}$  tons of coal from a depth of 2,530 feet at the above enormous rope velocity of about 2,000 feet per minute.

It may be stated that the drum shaft is provided with two heavy bearings, fitted with ring lubrication, these bearings being mounted upon a built-up wrought iron bed plate, together with the bearings of the motor.



tion, having a maximum capacity for an overload of 1,400 horsepower, the normal output being 565 horsepower. It operates on a circuit of 480 volts, with a speed of 24 revolutions per minute, and is directly coupled to the Keepe drum, which is  $26\frac{1}{4}$  feet in diameter, provided with a balance rope having a velocity of 1,980 feet per minute.

The hoist is situated at a distance from the power station, which also supplies electric current for pumping electric ventilation, and for operating other motors about the colliery. This electric mine hoisting system was specially designed to take advantage of the good governing properties of the turbine generating plant, whereby the fluctuation in the input of the hoisting



motor supplied by it are transferred directly to the boiler plant, without causing under variations in the speed of the turbines, and at the same time with the auxiliary equipment ensuring good economy from the steam turbine.

This electric hoist is supplied by its own generator, which is driven by a steam turbine of the Brown-Boveri type, with a separate exciter, which also excites the field of the hoisting motor, as well as the field of an alternator directly connected to the same steam turbine.

The turbine operates under a steam pressure of 135 pounds per square inch and 275 degrees C., the exhaust being connected with a vacuum of 90 per cent. at the turbine to the central condensing plant.

An interesting point in connection with this steam turbine is that it admits steam at boiler pressure into the secondary expansion of the turbine, in accordance with the requirements of the hoisting motor automatically, it being provided with a by-pass, which is self-acting.

It will thus be seen that the load variation due to the hoist comes directly upon the boiler without any intermediate machinery between the mine hoisting motor and the turbine-driven generator. It will be noted that this arrangement acts as a natural accumulator or storage, the peak loads being taken care of by the boilers, which are provided with stored steam. There are a great many advantages in this method of working electric mine hoists, as it is simple, safe, and reliable, avoiding rotating flywheel masses and the intermediate machinery, and is at the same time low in cost for installation. The conversion and storage losses of the other electric mine hoisting system are avoided, and there is good economy in the steam turbine set during the intervals when electric energy is not utilized for electric hoisting by the connection of the steam turbine to the second electrical generator.

It is stated that the Mauveschacht electric hoist can be doubled as to capacity by directly connecting to the hoisting drum a second electric motor on the other side, if desired.

At the present time the electric hoist is only required to raise about one-half the above-mentioned load of coal at the high rope velocity previously stated from a depth of 1,770 feet. When the electric hoist was installed it was decided to provide for two installations, the second being added when the pit is fully developed at a later period, the shaft of the winding drum being provided with a coupling at each end.

At the present time only one end is equipped with a motor, which is capable of developing, as above mentioned, an overload of 1,400 horsepower without injury for short intervals.

This high-power electric motor is of the direct current, separately-excited type, and is mainly controlled by regulation of the generator voltage. The pressure at the motor terminals is varied from zero to 480 volts by means of a regulator in the field circuit of the generator, this arrangement reducing to a minimum the rheostatic losses. It may be stated that the main terminals of the motor are directly connected to the steam-turbine-driven, direct-current generator, and there is thus avoided all losses and annoyance of switching in main circuit regulation.

The steam turbine, as above mentioned, also drives a second generator, which is an alternator, supplying current for other motors at the mine, this second dynamo being driven in tandem with the generator which supplies the hoisting motor, and is a most essential part of this system of electric mine haulage, which allows the steam turbine to always be operated with high economy on account of the constant load it provides.

## THE DETERMINATION OF TUNGSTIC ACIDS IN LOW-GRADE WOLFRAM ORES.\*

By H. W. Hutchin, Associate, and F. J. Tonks, Student.

The determination of small quantities of tungstic acid by known methods is difficult, besides involving considerable time and labour. The new method described herein combines the accuracy of the mercurous nitrate method with an improvement in the attack of the mineral; viz., fusion with alkalis is replaced by digestion with caustic soda solution. The advantages gained are in time, accuracy and general utility. A single assay of a sample of ore may be completed in 2½ hours; six or more assays may be worked in a batch as easily as one. The preliminary treatment with hydrofluoric acid becomes unnecessary. The charge of ore is not limited to 1 or 2 gm., but as much as 20 gm. may be used if necessary. The use of a large charge secures greater accuracy in the determination of tailings values, exactly where accuracy is most needed.

The paper is divided into two sections. Section I. deals with the working details of the assays employed

and the tabulation of results for comparison. Section II. is supplementary and mainly an investigation of conditions affecting the two principal assays, viz., the aqua regia method and the new method.

### Section I.

The methods of analysis in common use are:—

1. The aqua regia method.
2. Aqua regia method with previous treatment with hydrofluoric acid.
3. Fusion with alkalis and subsequent determination with mercurous nitrate.

The details of these assays are given in order that the investigations may be followed.

1. Aqua Regia Method.—(All assays by this method are stated in the table under the column headed "Aqua Regia Method.")—Five gm. of the finely powdered sample are digested at the boiling point with 50 cc. of hydrochloric acid for several hours; 10 cc. nitric acid are then added and the digestion continued for one or two hours. The assay is well diluted with water

\*Paper read before the Institution of Mining and Metallurgy, London, May 20, 1909.



and allowed to stand overnight. After filtering and washing, the tungstic acid in the residue is dissolved in dilute ammonia, filtered, and the ammonium tungstate acid obtained from ignition of the ammonium tungstate is evaporated with hydrofluoric acid to remove silica, and again ignited.

2. Aqua Regia Method with Previous Treatment with Hydrofluoric Acid, etc.—(Assays by this method are stated in the table under column headed "Modified Aqua Regia Method.")—Five grm. charges are evaporated with hydrofluoric acid in a platinum dish to dryness, the dried residue is subsequently transferred to a beaker with water giving a volume of about 40 cc. 5 cc. nitric acid is added and the assay gently warmed to remove the bulk of the mispickel. After well diluting and allowing to stand overnight it is filtered and the residue washed on to the paper, dried and burnt. The residue, after powdering again in an agate mortar, is decomposed by aqua regia, etc., as previously described.

Method 3. Determination by Fusion with Alkalis and subsequent Determination with Mercurous Nitrate.—(Assays by this method are stated in the table under column headed "Soda Fusion Method.")—Except for slight alterations of detail, Bollnheimer's method was followed, viz.: The silica and mispickel are removed from a 5 grm. charge as described in the previous method. The residue is again powdered and fused in a nickel dish with caustic soda and sodium peroxide. The melt, when cold, is extracted with water and diluted to 250 cc., of which 200 cc. of a filtered portion are used for the actual assay. The alkaline liquor is acidulated with nitric acid, followed by ammonia, till fairly alkaline, boiled, filtered and washed. The filtrate containing the tungsten is made neutral or faintly acid with nitric acid; mercurous nitrate solution is then added, followed by a little freshly precipitated HgO or a few drops of diluted ammonia. After warming and stirring, the precipitate settles well. It is determined as  $WO_3$  by ignition in a platinum crucible followed by treatment with hydrofluoric acid.

New Method.—Determination by Digestion with Caustic Soda Solution and subsequently by Mercurous Nitrate.—That wolfram is decomposed by boiling or by digestion on a water bath with caustic soda solution was noted in the course of laboratory experiments on wolfram products. Investigations followed to see if the reaction could be adapted to replace the fusion with soda. With a view to its use as a solvent for wolfram in low-grade ores it was desirable first to test it on a wolfram concentrate. A sample of wolfram concentrate (No. 24) was selected which had been agreed upon by buyer and seller—its value was 63.2%  $WO_3$ .

0.4146 grm. of the finely powdered sample was digested with about  $1\frac{1}{2}$  in. stick soda and 15 c.c. of water in a porcelain dish on a water bath for 45 minutes. The assay was diluted with water, a little sodium peroxide added, filtered and washed. The tungstic acid was determined in the filtrate by mercurous nitrate after removal of silica, etc., as in previous methods. The weight of  $WO_3$  obtained was 0.2610 grm.=62.97%  $WO_3$ .

The decomposition of wolfram under such conditions was sufficiently complete to make possible the assay of low values. Mispickel digested with soda solution is only slightly attacked; the effect of arsenic is dealt with later.

Details of the New Method of Assay as used for Low-grade Ores, Tailings, etc. (Assays by this method are stated in the table under column headed "New Method.")—The charge taken may be from 5 grm. upwards, or better 5.6, 11.2, 16.8 or any convenient multiple of 2.8, so that the milligrams of tungstic acid obtained represent simple ratios of lb.  $WO_3$  per ton of ore (long ton). 2.8 grm. (or multiple) is taken because only four-fifths of the solution is used for the actual assay, i.e., it is a convenient sort of "assay ton" for lb. per ton of 2,240 lb. under the special conditions of the assay. The charge is digested in a 4-in. porcelain dish with 20 cc. of a 25% solution of caustic soda (free from chloride) on a water bath for 30 to 45 minutes. The assay is next diluted, a little sodium peroxide added to oxidise any decomposition products of sulphides, then transferred to  $\frac{1}{4}$  litre flask and diluted to 250 cc.; 200 cc. of a filtered portion are first acidified with nitric acid, then made alkaline with ammonia. The assay is brought to the boiling point, filtered and washed. The filtrate is made slightly acid with dilute nitric acid, and mercurous nitrate solution added in excess followed by a few drops of dilute ammonia. On warming and stirring, the precipitate settles readily. After filtering and washing the precipitate with weak mercurous nitrate solution, the paper and precipitate are ignited together in a porcelain crucible, or, if the ore is free from arsenic, in a platinum crucible. Weigh as tungstic acid; with a charge of 5.6 grm., the milligrams obtained, divided by two, give lb.  $WO_3$  per ton.

For assays of ores and tailings the sample may be reduced to a sufficient degree of fineness in a wedgwood mortar, but for concentrates an agate mortar is necessary; fine powdering is essential. 20 cc. of a 25% solution of caustic soda is sufficient to decompose charges containing not more than 0.4 grm. of tungstic acid. The attack with soda is rapid under these conditions; 0.4 grm. of wolfram concentrate being decomposed in 15 minutes to the extent of 98% of its tungsten contents, but, as a rule, from 30 to 45 minutes is given.

Strength of Mercurous Nitrate Solution.—The solution may be conveniently prepared from mercury. From 2 to 3 oz. of mercury is digested in a large beaker or flask, with 25 cc. of nitric acid (sp. gm. 1.4) and 75 cc. of water on a hot plate near boiling point for one and a half hours, and left on the hot plate overnight. The extract, diluted to about 400 cc., will give a saturated solution with the minimum of free acid. 20 cc. is sufficient for most assays.

Where a porcelain crucible has (from the presence of arsenic in the ore) necessarily to be used, it is advisable to burn a batch of precipitates one after the other, and at the end transfer the accumulated tungstic acid to a platinum crucible for treatment with hydrofluoric acid. The loss with hydrofluoric acid is usually very small, e.g., on three assays of mineral from the battery, working with a charge of 5.6 grm., the total loss was 0.5 mg., equivalent to 0.08 lb. per ton on each assay.

In the presence of scheelite the method is not applicable since the mineral is only partly attacked under the conditions of the assay. The effect of varying charge is seen by reference to the results given in the table for samples No. 7, 10, 11, 13 and 23, in the column headed New Method.

In the table are set out assay results, by the various methods, of many kinds of products, including mineral from the battery, intermediate concentrates burnt and unburnt, finished concentrates both of tin and wolfram.



and tailings. The assays are stated in lb. of tungstic acid per ton except for No. 24, where % composition is given. The unreliability of the aqua regia methods is very evident.

### Remarks on Some of the Assays.

Sample No. 7.—The residual gangue from each of the three assays by the aqua regia method and from the one by the modified aqua regia method were tested by the "soda digestion" method (i.e., the new method) for tungstic acid. Since no tungstic acid was obtained the low results were not due to incomplete attack by aqua regia.

Sample No. 10.—In both assays by the ordinary aqua regia method it was impossible to obtain a clear ammoniacal filtrate; the high results were not surprising. The aqua regia filtrates, evaporated to dryness

gram. are not conveniently treated since the fusion introduces large quantities of solids into the assay, and in addition much time is occupied with the very necessary preliminary treatment with hydrofluoric acid.

### Section II.

Determination of the Solubility of  $WO_3$  in Aqua Regia Under Assay Conditions and the Recovery of the Dissolved  $WO_3$  from the Acid Liquors.

The following five charges were weighed out:—

| Experiment.          | I. | II. | III. | IV. | V. |
|----------------------|----|-----|------|-----|----|
| Wolfram, mg. ....    | 80 | 80  | 80   | 80  | 80 |
| Clay, grm. ....      | —  | 2   | 2    | —   | 2  |
| Fluorspar, grm. ...  | —  | —   | 2    | —   | —  |
| Mispickel, grm. .... | —  | —   | —    | 1.5 | —  |

ASSAY RESULTS IN POUNDS OF TUNGSTIC ACID PER TON OF 2240 LB., EXCEPT FOR SAMPLE 24, WHERE PERCENTAGE IS GIVEN.

| Sample Number. | AQUA REGIA METHOD. |                      | NEW METHOD.  |                          | MODIFIED AQUA REGIA METHOD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   | SODA FUSION METHOD. |                   |
|----------------|--------------------|----------------------|--------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------|-------------------|
|                | Assay Value.       | Weight of Charge.    | Assay Value. | Weight of Charge.        | Assay Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Weight of Charge. | Assay Value.        | Weight of Charge. |
| 1              | 5.4                | 5 grm.               | 9.4          | 5 grm.                   | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | —                 | 9.0                 | 5 grm.            |
| 2              | 3.4                | 5 "                  | 4.9          | 5 "                      | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | —                 | —                   | —                 |
| 3              | 12.0               | 5 "                  | 14.3         | 5 "                      | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | —                 | —                   | —                 |
| 4              | 1.6                | 5 "                  | 8.5          | 5 "                      | 6.25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 5 grm.            | —                   | —                 |
| 5              | 13.9               | 5 "                  | 13.5         | 5 "                      | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | —                 | —                   | —                 |
| 6              | 1.0                | 5 "                  | 5.5          | 5 "                      | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | —                 | —                   | —                 |
| 7              | 3.5                | 5 "                  | 13.7         | 5 "                      | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | —                 | —                   | —                 |
|                | 1.0                | 5 "                  | 14.2         | 10 "                     | 1.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 5 grm.            | 11.5                | 4.48 grm.         |
|                | 5.8                | 5 "                  | 14.1         | 15 "                     | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | —                 | —                   | —                 |
| 8              | 1.5                | 5 "                  | 7.0          | 5 "                      | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | —                 | —                   | —                 |
| 9              | 7.5                | 5 "                  | 7.5          | 5 "                      | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | —                 | —                   | —                 |
| 10             | 24.8               | 5.6 "                | 22.0         | 5.6 "                    | 14.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 4.48 grm.         | —                   | —                 |
|                | 24.8               | 5.6 "                | 21.0         | 11.2 "                   | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | —                 | —                   | —                 |
|                | —                  | —                    | 22.4         | 5.6 + 4.5 grm. mispickel | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | —                 | —                   | —                 |
| 11             | —                  | —                    | 1.85         | 8.4 grm.                 | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | —                 | —                   | —                 |
| 12             | 95                 | 5 grm.               | 1.70         | 16.8 "                   | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | —                 | —                   | —                 |
| 13             | 94                 | 5 "                  | 94           | 1.25 "                   | <b>DESCRIPTION OF SAMPLES.</b><br>1 to 9 inclusive.—Samples of mineral from the battery containing mispickel (1.5 % As), cassiterite ( $SnO_2$ 1.5 %), copper pyrites (25 % Cu) and associated lode minerals:—quartz, felspar, mica, fluorspar, chlorite and tourmaline.<br>10 and 11 —Artificial mixtures of wolfram concentrate and tailings (free from arsenic and wolfram). The calculated value of 10 = 22.4 lb. $WO_3$ , of 11 = 1.9 lb. $WO_3$ .<br>12, 13, 14 and 15.—Finished tin concentrates from the magnetic separator, the % of tin varies from 65 to 73<br>16, 17, 18, 19 and 20 —Various unburnt intermediate concentrates prepared from mineral similar to samples 1—9. Their approximate values for arsenic are:—16 = 1.5 %, 17 = 5 %, 18 = 20 %, 19 = 23 %, 20 = 12 %.<br>21 and 22 —Samples of burnt intermediate concentrates with 1 % of arsenic retained mainly as arsenate.<br>23.—A rich arsenical concentrate (24.5 % As and 5 % Cu) prepared by the Elmore Oil Process from mineral containing wolfram<br>24.—A sample of finished wolfram concentrate<br>25.—A sample of tailings |                   |                     |                   |
|                | —                  | —                    | 93.6         | 1.25 "                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
|                | —                  | —                    | 93.0         | 2.8 "                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
| 14             | 9.8                | 5 "                  | 94.0         | 5.6 "                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
|                | Nil                | 5 + 1.5 of mispickel | 9.8          | 5.6 "                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
|                | 130                | 5 grm.               | —            | —                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
| 15             | 104                | 5 + 1.5 of mispickel | —            | —                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
| 16             | 2                  | 5 grm.               | 9.5          | 5.6 grm.                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
| 17             | 17                 | 2 "                  | 41           | 5.6 "                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
| 18             | 108                | 2 "                  | 156          | 2.8 "                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
| 19             | 3                  | 5 "                  | 16.5         | 2.8 "                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
| 20             | 66                 | 2.24 grm             | 90.5         | 2.8 "                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
| 21             | 234                | 1.12 "               | 262          | 1.4 "                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
| 22             | 37                 | 2.24 "               | 48           | 2.8 "                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
| 23             | —                  | —                    | 1.25         | 5 "                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
|                | —                  | —                    | 1.0          | 28. "                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
|                | —                  | —                    | 62.97 %      | 0.4146 grm.              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
| 24             | 63.2 %             | 1 grm.               | 63.2 %       | 0.5 "                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
|                | —                  | —                    | 63.6 %       | 0.5 + 20 mg of $As_2O_3$ |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
|                | —                  | —                    | 9.0          | 5.6 grm.                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |
| 25             | 2.5                | 5 "                  | —            | —                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                     |                   |

and tested for tungstic acid, yielded a trace only. From the acid filtrate of the assay by the modified aqua regia method, tungstic acid equivalent to 6 lb. per ton was recovered by evaporation, making a total of 20 lb. The increased solubility of the tungstic acid can only be accounted for by the supposition that fluorides influence the solubility.

The effect of mispickel, or more correctly of arsenic, on the solubility of tungstic acid in aqua regia is seen by reference to the two assays each of samples 14 and 15 in the column headed "Aqua Regia Method."

The assays of samples 11 and 23 indicate the usefulness of the new method in accurately determining exceedingly small values.

The method involving fusion with alkalis and subsequent determination with mercurous nitrate is a very good one, and the results are reliable. It is, however, unsuitable for frequent use; larger quantities than 5

(The tungstic acid in each of experiments I., II., III. and V. was 50 mg.; experiment IV. contained 60 mg., the extra amount being carried by the mispickel added.)

To each 50 cc. of HCl were added and boiled until the decomposition of the wolfram was complete; 10 cc. of nitric acid were then added and digestion continued for 30 minutes more.

The assays were well diluted and allowed to stand overnight. As noted at the time of dilution in experiment I., the  $WO_3$  soon commenced decomposition in a finely divided form, but took a long time to settle; in experiment II., the presence of the clay somewhat masked the appearance, which seemed very much like experiment I., except that it settled quicker; experiment III. settled readily with a clear liquor and no very decided appearance of  $WO_3$  visible most decidedly

less than in experiment I.; experiment V. settled at once with no appearance of  $\text{WO}_3$ .

Their appearance next morning was not very different, except that the assays containing fluorides showed a tendency for  $\text{WO}_3$  to salt out at the surface and in places where a glass rod had touched the sides of the beaker.

Each assay was filtered and washed. The  $\text{WO}_3$  in the residues was determined as usual with  $\text{AmHO}$ , etc.—the weights of  $\text{WO}_3$  obtained being:—

| I.     | II.    | III.   | IV.      | V.      |
|--------|--------|--------|----------|---------|
| 48 mg. | 56 mg. | 20 mg. | 12.4 mg. | 2.4 mg. |

The ammoniacal filtrates in experiments II. and III. were turbid, II. was particularly bad and was not improved by repeated filtration—the  $\text{WO}_3$  obtained even after treatment with hydrofluoric acid was far too white to be accepted as reasonably pure.

Recovery of the dissolved  $\text{WO}_3$ .—The acid filtrates were evaporated to dryness and the residues gently ignited. After dissolving in a mixture of 5 cc.  $\text{HNO}_3$  and 10 cc.  $\text{HCl}$  the solution was well diluted and allowed to stand for 12 hours. By comparison the order of recovery was easily perceptible by eye, but the actual amounts recovered as determined in  $\text{AmHO}$ , etc., were:—

| I.    | II.     | III.     | IV.     | V.       |
|-------|---------|----------|---------|----------|
| 1 mg. | 9.5 mg. | 26.0 mg. | 3.0 mg. | 45.0 mg. |

It is very probable that in experiment I. the  $\text{WO}_3$  obtained was really due to a faint turbidity.

The experiments prove conclusively the effect of fluorides and arsenic on the solubility of  $\text{WO}_3$  in aqua regia. The effect of the former may be eliminated by evaporation, but the effect of the latter is more pronounced and difficult to eliminate.

Attempts were made to recover  $\text{WO}_3$  from arsenical liquors by the following methods, but with only partial success, since lime is rarely absent from ores.

(The only practicable method would seem to involve a fusion of the residues from evaporation of the liquor with sodium carbonate.)

The aqua regia filtrate after evaporation was again taken to dryness with 10 cc.  $\text{HNO}_3$  to expel chlorides. The residue was digested with soda solution for 15 minutes, filtered and washed. The  $\text{WO}_3$  was then determined by mercurous nitrate after removing silica, alumina, etc., by ammonia, and the arsenic by magnesia mixture.

In the assay of sample No. 20 referred to in the table the acid filtrate yielded  $\text{WO}_3$  equivalent to 6.0 lb. per ton by evaporation, and a further amount equivalent to 10 lb. per ton by the method described.

In addition to determining factors which may cause low results in the aqua regia method, the possibility of factors tending to give high results by the "soda digestion," or new method, was recognized and investigated.

The burnt concentrates, in addition to a little unburnt mispickel, always contain small quantities of arsenate, so that arsenates would certainly be present in the soda extract.

The Action of Caustic Soda on Mispickel.—In working the assays by the soda digestion method, a yellow coloured solution was always obtained when mispickel was present, the richer the sample in mispickel the more pronounced being the colour. Dilution and addition of a little sodium peroxide removed the colour, the change being accompanied by a small precipitate of ferric hydrate. In the first instance, in seeking for

evidence of attack of mispickel by soda the alkaline liquors were tested for sulphide with lead acetate and found to be free, but as it is more than probable that iron sulphide would be formed in the first stage of attack the test was not conclusive. Using magnesia mixture, arsenic was detected in the assay liquors, the precipitate of silica, alumina, etc., also carried small quantities of arsenic.

#### Determination of the Amount of Decomposition.

1. Rich Arsenical Concentrates.—The sample used was No. 23 (see description in the table). A 5-grm. charge was digested with soda as in an assay, diluted, treated with peroxide of sodium, filtered and washed. The silica and alumina were removed as customarily and the arsenic in the filtrate obtained, separated by magnesia mixture giving 18 mg. of magnesium pyroarsenate, equivalent to 13.5 mg. of  $\text{As}_2\text{O}_5$ .

2. A Typical Sample of Ore (containing 1.5% As).—4.48 grm. of sample No. 7 (description in the table), treated as in 1., gave 3.5 mg. of pyroarsenate = 2.6 mg. of  $\text{As}_2\text{O}_5$ . The amount of decomposition, though small, could not be ignored, more especially as in weathered ores such as dump samples and old tailings, and also in burnt concentrates, the proportion of arsenic soluble in soda might be considerably more.

#### The Effect of Arsenic in the Mercurous Nitrate Method.

Two solutions were prepared:—

1. A solution of  $\text{As}_2\text{O}_5$  in dilute  $\text{HNO}_3$  strength 1 cc. = 1 mg.  $\text{As}_2\text{O}_5$ .

2. A solution of  $\text{WO}_3$  in dilute ammonia, strength 1 cc. = 1 mg.  $\text{WO}_3$ .

(a) The Behaviour of Mercurous Arsenate on Ignition.—100 cc. of the arsenic solution was (after carefully neutralizing) precipitated with mercurous nitrate; the precipitate after filtering, washing and drying, was detached from the paper and ignited over a Bunsen burner in a porcelain crucible for 10 minutes. The residue, which was still yellow and showing slight signs of fusion, weighed 0.2774 grm. On further ignition over a large burner the product fused and volatilized, leaving a small whitish residue of 2.5 mg. Its appearance suggested corrosion of the crucible.

The experiment was repeated with another 100 cc., but the paper and mercurous arsenate were burnt together; an ignition of five minutes over a moderate Bunsen flame was quite long enough to volatilize the product, leaving a small white infusible residue of 1.8 mg.

40 cc. of the arsenic solution treated in the same manner left a residue of 1 mg.

The presence of the filter paper during the ignition of mercurous arsenate by acting as a reducing agent facilitates its decomposition and volatilization.

100 cc. of the tungstic acid solution treated in like manner yielded .0990 grm.  $\text{WO}_3$ , and .0988 in duplicate.

(b) The Behaviour of Mixed Mercurous Tungstate and Arsenate on Ignition.

|                                                                | I.      | II.     | III.    |
|----------------------------------------------------------------|---------|---------|---------|
| $\text{WO}_3$ solution taken.....                              | 100 cc. | 100 cc. | 100 cc. |
| $\text{As}_2\text{O}_5$ solution taken....                     | 10 cc.  | 50 cc.  | 100 cc. |
| Weight of $\text{WO}_3$ obtained.                              | .0997   | .1005   | .1005   |
| Less correction for residue from $\text{As}_2\text{O}_5$ ..... | .0995   | .0995   | .0987   |

The three experiments, conducted like the previous ones with arsenic, viz., paper and precipitate being



burnt together, show that the effect of arsenic is a negligible factor in products containing 100 lb.  $\text{WO}_3$  per ton or less, even ignoring the correction for the residue obtained from the arsenic solution.

(c) The Separation of  $\text{As}_2\text{O}_5$  from  $\text{WO}_3$  by Magnesia Mixture.

|                                              |           |            |
|----------------------------------------------|-----------|------------|
| $\text{WO}_3$ solution taken .....           | 50 cc.    | 100 cc.    |
| $\text{As}_2\text{O}_5$ solution taken ..... | 20 cc.    | 30 cc.     |
| $\text{WO}_3$ recovered .....                | .030 grm. | .0972 grm. |

In the two experiments IV. and V. the arsenic was removed by magnesia mixture previous to the determination of the  $\text{WO}_3$ .

For experiment IV. the magnesia mixture was made from ordinary calcined magnesia. The loss of .019 grm. of  $\text{WO}_3$  is the effect of lime contained by the magnesia. For experiment V. the magnesia mixture was made from magnesium ribbon.

As to whether the separation of  $\text{As}_2\text{O}_5$  from  $\text{WO}_3$  is actually attended with a slight loss of the latter the authors do not feel justified in stating an opinion; further investigation was discontinued.

**The Effect of Arsenic Added in the Form of Mispickel.**

(d) 2.24 grm. of the sample 23 (see description in the table) were digested with soda, diluted, treated with peroxide, and filtered into 100 cc. of the ammonium tungstate solution. By so doing the conditions of an actual assay were obtained with freedom from sampling error. The joint liquors assayed for  $\text{WO}_3$  without removing the arsenic give: .1010 grm.  $\text{WO}_3$ , subject to a deduction of 1 milligram for  $\text{WO}_3$  contained by the 2.24 grm. charge of sample No. 23.

(e) Ore No. 10 with a charge of 5.6 grm. and 4.5 grm. of mispickel added assayed, without the removal of arsenic, 22.4 lb.

(f) 1.25 grm. wolfram concentrates (refer to Table No. 24) was digested for 75 minutes with 7.5 grm. caustic soda dissolved in 20 cc. water. The extract was treated with a little peroxide, diluted to 250 cc. and filtered. Two portions of 100 cc. each of the filtrate were assayed for tungstic acid by precipitation with  $\text{HgNO}_3$ , to one portion 25 cc. of the arsenic acid solu-

tion were previously added, to the other no arsenic. 0.3180 grm. of  $\text{WO}_3$  was obtained from the former, 0.3162 grm. from the latter, the percentage of  $\text{WO}_3$  being 63.6 and 63.2% respectively.

#### General Remarks.

The authors have found the new method exceedingly useful for assays of battery pulp and tailings. The records obtained over a long period are such as to enable the wolfram losses to be apportioned to the respective products with a degree of accuracy hitherto unattainable. The comparison of losses when crushing to different sizes is not only possible, but has been attempted with success. Screening tests, whether of battery pulp or tailings, may be attempted with confidence. An example of the method on a sample of tailings is given:—

A charge of 11.2 grm. was used for each of the assays.

By direct assay the sample gave 4.75 lb.  $\text{WO}_3$  per ton. The slime was separated from the sand by decantation with water and the sand separated into two portions with a 60 sieve. The three products were then assayed for  $\text{WO}_3$ .

#### Screening Test of Tailings.

| Description.         | % by Weight | Assay Value.                          |
|----------------------|-------------|---------------------------------------|
| Left on 60 sieve ..  | 22.6        | 0.5 lb. $\text{WO}_3$ per ton.        |
| Passed 60 sieve .... | 53.8        | 4.0 " " " " }                         |
| Slimes .....         | 23.6        | 11.7 " " " " } Average 5 lb. per ton. |

For work of this kind the new method is not only more accurate, but is speedier than any other method.

The method is applicable to most wolfram ores; there may be some ores where the presence of particular minerals may necessitate modifications of the assay.

In conclusion it has been brought to the authors' notice that the use of caustic soda has been patented as a process for the production of tungstate of soda from wolfram; the investigations were conducted quite independently.

## THE COVINGTON COKE DRAWING AND LOADING MACHINES.

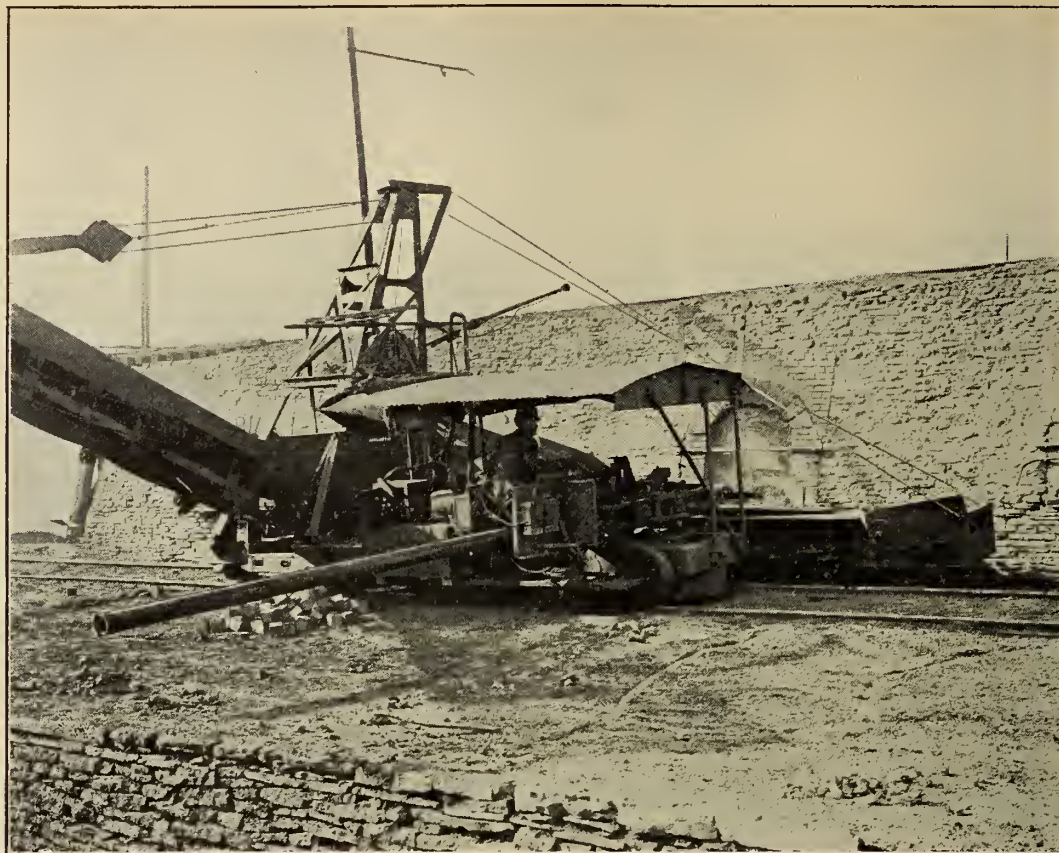
It is a curious fact that human inventiveness has stopped short in several industries. With strangely universal apathy, certain devices and methods that should have been obsolete fifty years ago, yet form integral parts of modern metallurgical plants.

One survival is the stamp mill. Admirable as is the equipment of modern gold mills, no one can contend that the stamp mill is an efficient mechanical contrivance. It is an inheritance from the middle ages. Other instances could be quoted. But the most glaringly wasteful of all is the bee-hive coke oven, for the operation of which a totally disproportionate amount of manual labor is necessary. Moreover, the loss in heat-energy and by-products amounts to from 30 per cent. to 50 per cent.

That such patent and prodigal wastefulness has survived so long is astonishing. One reason is, of course,

the light initial cost of the bee-hive as compared with by-product ovens. The natural antipathy of old-fashioned operators to change, is another. Both are insufficient to justify the unprofitable employment of men when a machine can do the work with far greater efficiency and despatch.

There is now installed at the plant of the Atikokan Iron Co., Port Arthur, Ont., a coke drawing and loading machine that is revolutionizing the operation and construction of coke ovens. Its effect upon operating expenses is clear when it is stated that with it two men can draw and load into cars the coke from 30 to 40 ovens per day, thus doing the work of from 10 to 13 men. In the construction of new ovenyards the machine makes it unnecessary to include expensive yard walls, fills, and cuts, as it delivers the coke into the cars on a level siding.



696-2

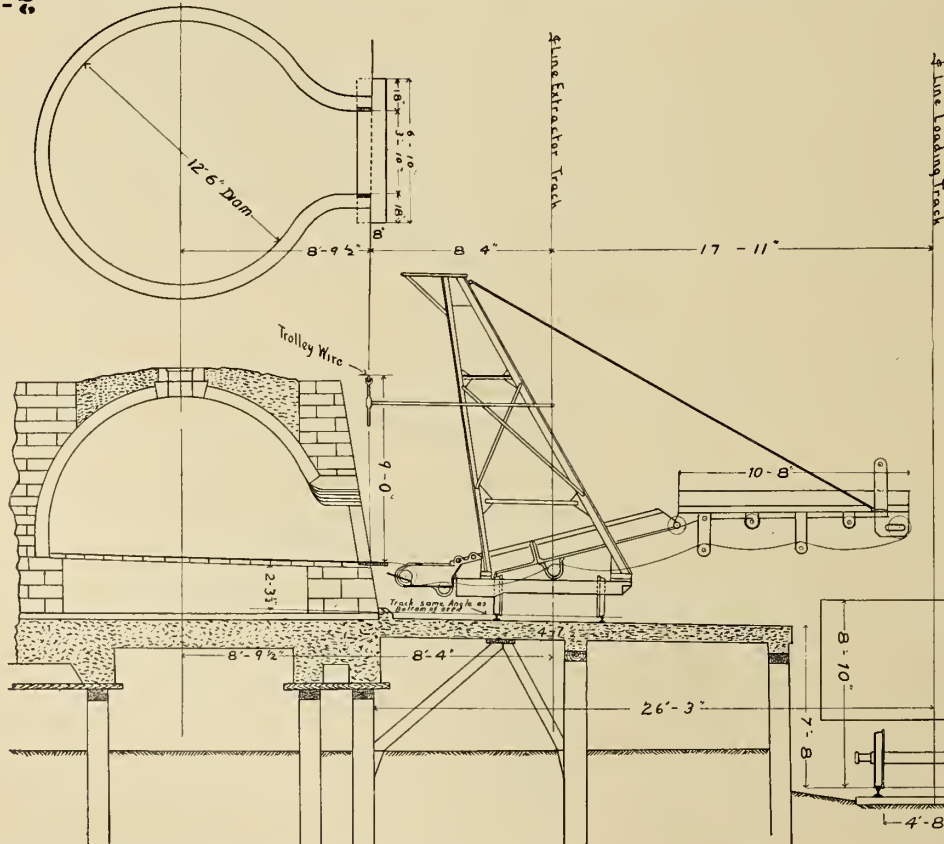


Diagram of Boom & Yard  
for  
Atikokan Iron Co., Ltd.  
Covington Machine Co  
Covington, Va.

June 1, 1909

| Number   | Hand  | Our       | Atikokan Iron  | Line     | Length of | Volage | Style of  |
|----------|-------|-----------|----------------|----------|-----------|--------|-----------|
| Machines |       | Order No. | Order No.      | Ordn.    | Railroad  |        | Machine   |
| 1        | L. H. | 545       | Letter No. 230 | Straight | 23'-0"    | 250    | 1909 Type |



To-day, in the Pennsylvania coke regions there are over 120 of these machines, the Covington coke drawing and loading machines, installed. More than 4,000 ovens are served. The manufacturers are the Covington Machine Company, Covington, Virginia.

The accompanying half-tone shows the machine in operation. The diagram shows a cross section of the Atikokan yard as arranged for the machine.

The 1909 Covington machine is an improvement on its predecessors. The conveyor and drive-chains are of manganese steel. All important gears are of cast steel, and bronze bushings have supplanted cast iron in all bearings.

As now constructed the machine requires only a distance of 27 inches from the line of the bottom of the oven to the line of the top of the machine track, as

against 41 inches required by earlier models. Little or no grading is required.

The ram-carriage is now moved by a small motor, thus doing away with the arduous manual labor required by the hand-wheel and screw of former models.

One operator can easily handle the machine all day long.

The extractor and conveyor trucks may be uncoupled thus allowing the extractor to move up and down the track while drawing the oven, the conveyor remaining stationary and depositing the coke at one point in the car.

Altogether the Covington machine, inasmuch as it does away with distressingly arduous manual labor, and saves money in erection and operation of ovens, is an innovation that should be welcomed in Canada.

## Note on the Determination of Carbon and Phosphorus in Steel.\*†

By Andrew A. Blair, Philadelphia, U.S.A.

It will be remembered that in the last paragraph of the joint report on "Comparison of Methods for the Determination of Carbon and Phosphorus in Steel," by Baron H. Juptner von Jonstorff (Austria); Andrew A. Blair (United States); Gunnar Dillner (Sweden); and J. E. Stead, F.R.S., Member of Council (England), it was stated that "the committee are continuing their investigations, and are endeavouring to ascertain whether or not hydrocarbon gases do escape when steel is dissolved in cupric potassium chloride, and the reason for the discrepancies shown above, the results of which will be presented on some future occasion."

On October 23, 1906, the following results were sent to Mr. J. E. Stead, and were reserved by him in the hope that other communications would be forthcoming from the other members of the committee. As I am given to understand that no such communications have been received, I suggested that my report should be presented independently at the May meeting, 1909.

In accordance with the programme suggested by Mr. Stead, I have made the following experiments, having previously obtained supplies of drillings of No. 1 and No. 4 International Standard Steels as prepared for the use of the International Committee and of the "Special Arsenic Standard" prepared for the American Committee.

The advantages to be gained by the use of these steels in an investigation of this character is apparent.

The analysis of these steels is as follows:—

### No. 1 International Standard.

|                     | English<br>Committee.<br>Per cent. | Swedish<br>Committee.<br>Per cent. | American<br>Committee.<br>Per cent. |
|---------------------|------------------------------------|------------------------------------|-------------------------------------|
| Carbon . . . . .    | 1.414                              | 1.450                              | 1.440                               |
| Silicon . . . . .   | 0.263                              | 0.257                              | 0.270                               |
| Sulphur . . . . .   | 0.006                              | 0.008                              | 0.004                               |
| Phosphorus . . . .  | 0.018                              | 0.022                              | 0.016                               |
| Manganese . . . . . | 0.259                              | 0.282                              | 0.254                               |

### No. 4 International Standard.

|                      | English<br>Committee.<br>Per cent. | Swedish<br>Committee.<br>Per cent. | American<br>Committee.<br>Per cent. |
|----------------------|------------------------------------|------------------------------------|-------------------------------------|
| Carbon . . . . .     | 0.151                              | 0.170                              | 0.160                               |
| Silicon . . . . .    | 0.008                              | 0.015                              | 0.015                               |
| Sulphur . . . . .    | 0.039                              | 0.048                              | 0.038                               |
| Phosphorus . . . . . | 0.078                              | 0.102                              | 0.088                               |
| Manganese . . . . .  | 0.130                              | 0.130                              | 0.098                               |

### Special Arsenic Standard.

|                      | Full<br>Analysis.<br>Per Ct. | Determinations of Phosphorus. |                       |
|----------------------|------------------------------|-------------------------------|-----------------------|
|                      |                              | Analyst                       | Phosphorus<br>Per Ct. |
| Carbon . . . . .     | 0.466                        |                               |                       |
| Phosphorus . . . . . | 0.098                        |                               |                       |
| Manganese . . . . .  | 0.720                        | P. W. Shimer                  | 0.098                 |
| Sulphur . . . . .    | 0.043                        | C. B. Dudley                  | 0.099                 |
| Silicon . . . . .    | 0.296                        | T. M. Brown                   | 0.104                 |
| Copper . . . . .     | 0.056                        | A. A. Blair                   | 0.098                 |
| Arsenic . . . . .    | 0.185                        | W. P. Barba                   | 0.095                 |

In composition these steels vary sufficiently to cover practically all classes of ordinary carbon steels, and the results obtained should furnish evidence of the accuracy of the different methods used, taking for granted the skill of the analyst and the care exercised by him in carrying out the work.

### Determination of Phosphorus.

By the regular method for phosphorus adopted by Sub-Committee on Standards of American International Steel Standards Committee, and described in the Journal of the Iron and Steel Institute, 1904, No. I. p. 239:—

Phosphorus.  
Per cent.

|                                    |       |
|------------------------------------|-------|
| No. 1 Standard . . . . .           | 0.016 |
| No. 4 Standard . . . . .           | 0.088 |
| Special Arsenic Standard . . . . . | 0.098 |

By the Eggertz method 2 grammes of steel used.

The precipitate of ammonium phosphomolybdate was filtered on an asbestos felt in a Gooch crucible, washed with water and molybdate (1—1), then with 1

\*Supplement to the Report presented in October, 1904. Journal of the Iron and Steel Institute, 1904, No. 11, pp. 221-273.

†Paper read before the Iron and Steel Institute, London, May, 1909.



per cent. nitric acid, and dried for two hours at 110° C. and weighed. The precipitate was then dissolved in dilute ammonia acidulated with sulphuric acid, reduced and nitrated as in the first method:—

|                               | Weight of<br>Ammonium<br>Phospho-<br>molybdate. | Phosphorus<br>(factor<br>0.153). | Phosphorus<br>by<br>Titration. |
|-------------------------------|-------------------------------------------------|----------------------------------|--------------------------------|
| No. 1 International Standard. | 0.0210                                          | 0.017                            | 0.017                          |
| No. 4 International Standard. | 0.1046                                          | 0.085                            | 0.085                          |
| Special Arsenic Standard..    | 0.1273                                          | 0.104                            | 0.104                          |

I have made many determinations in other steels by these two methods, and the results agree very closely in all cases. In the committee's methods the results are obtained in much less time and with less labour than in the Eggertz method. The question of weighing the precipitate of phosphomolybdate or of dissolving, reducing, and titrating it, seems to be largely a matter of custom or personal preference. I believe the titration method to be the more rapid of the two, and I use it continually with perfect satisfaction and confidence.

#### Determination of Carbon.

The suggestion of Baron Juptner that hydrocarbons are evolved when steel is acted on by ammonium or potassium cupric chloride seems reasonable, and the facts in regard to it should be determined positively.

In addition to the two International Standards, there was prepared for me by the Midvale Steel Company of Philadelphia (for whose kindness in this matter I wish to make suitable acknowledgment) a sample of steel containing about 1.2 per cent. carbon, one bar annealed at 550° C., one annealed in lime, and one hardened.

These samples were all treated as follows: A factor weight (2.7276 grammes) was introduced into a 400 cubic centimetre Erlenmeyer flask fitted with a stopper carrying two tubes, one reaching to the bottom of the flask and connecting with the supply of properly purified oxygen and air, and the other beginning just below the stopper and connecting with a copper tube filled with oxide of copper. The copper tube passed through a gas furnace and was heated to a bright red. The copper tube was connected with an ordinary purifying train consisting of a U tube filled, one end with anhydrous cupric sulphate and the other with solid cuprous chloride, and a second U tube filled with dried calcium chloride. To this purifying train was attached an absorption apparatus consisting of a Liebig bulb containing potassium hydrate and a drying tube containing dried calcium chloride. A guard tube containing calcium chloride completed the train. The absorption apparatus was weighed, the entire train connected, and 200 cubic centimetres of the potassium cupric chloride introduced into the Erlenmeyer flask. A current of purified oxygen was passed through the apparatus until the steel and the deposited copper were dissolved, when air was substituted for the oxygen. The absorption apparatus was then weighed. The current of oxygen passing through the liquid in the Erlenmeyer flask carried forward any gases generated by the action of the copper salt on the steel, and complete oxidation was insured by the red-hot oxide of copper in the tube. It was found that the deposited copper had a tendency to cement the steel drillings into a compact mass very difficult to dissolve in the

excess of copper salt. This was overcome by mixing the drillings with coarse ignited quartz sand, so that, aided by an occasional shaking of the flask and the gradual heating of the solution by the radiant heat from the furnace, complete solution was effected in about two hours.

The residue on the flask was filtered on an asbestos felt in a platinum boat and burned in the regular way in a platinum tube in a current of oxygen. The result served as a check on the work. When the neutral copper salt was used there was always a heavy deposit of basic ferric chloride or ferric oxide in the solution, and at the end of the operation it was necessary to introduce into the Erlenmeyer flask about 30 or 40 cubic centimetres of hydrochloric acid 1.1 specific gravity to dissolve it. This was generally done when air was substituted for the oxygen.

The determinations were checked by direct combustion of the drillings in a platinum boat, partly filled with ignited alumina, in a platinum tube in a current of oxygen. The tube was heated to intense redness, and the operation was conducted exactly as described on p. 134 of the sixth edition of the "Chemical Analysis of Iron," and by solution of the drillings in acid potassium cupric chloride, filtration and combustion of the residue in oxygen. The results are shown in the following tabulated statement:—

#### No. 1 International Standard.

|                                                                                     | Carbon.<br>Per cent. |
|-------------------------------------------------------------------------------------|----------------------|
| Combustion of evolved gases from acid solution of potassium chloride.....           | 0.000                |
| Combustion of residue from flask.....                                               | 1.451                |
| Combustion of evolved gases from neutral solution of potassium cupric chloride..... | 0.001                |
| Combustion of residue from flask.....                                               | 1.396                |
| Direct combustion of drillings.....                                                 | 1.459                |
| Solution in acid potassium cupric chloride and combustion of residue.....           | 1.446                |

#### No. 4 International Standard.

|                                                                                     | Carbon.<br>Per cent. |
|-------------------------------------------------------------------------------------|----------------------|
| Combustion of evolved gases from acid solution of potassium chloride.....           | 0.005*               |
| Combustion of residue from flask.....                                               | 0.142                |
| Combustion of evolved gases from neutral solution of potassium cupric chloride..... | 0.000                |
| Combustion of residue from flask.....                                               | 0.141                |
| Direct combustion of drillings.....                                                 | 0.157                |
| Solution in acid potassium cupric chloride and combustion of residue .....          | 0.158                |

#### Sample Annealed at 550° C.

|                                                                                     | Carbon.<br>Per cent. |
|-------------------------------------------------------------------------------------|----------------------|
| Combustion of evolved gases from acid solution of potassium cupric chloride.....    | 0.003*               |
| Combustion of residue from flask.....                                               | 1.252                |
| Combustion of evolved gases from neutral solution of potassium cupric chloride..... | 0.004*               |
| Combustion of residue from flask.....                                               | 1.246                |
| Direct combustion of drillings .....                                                | 1.259                |
| Solution in acid potassium cupric chloride and combustion of residue .....          | 1.258                |



## Sample Annealed in Lime.

|                                                                                     | Carbon.<br>Per cent. |
|-------------------------------------------------------------------------------------|----------------------|
| Combustion of evolved gases from acid solution of potassium cupric chloride.....    | 0.006*               |
| Combustion of residue from flask.....                                               | 1.251                |
| Combustion of evolved gases from neutral solution of potassium cupric chloride..... | 0.005                |
| Combustion of residue from flask.....                                               | 1.236                |
| Direct combustion of drillings.....                                                 | 1.253                |
| Solution in acid potassium cupric chloride and combustion of residue .....          | 1.252                |

## Sample hardened.

|                                                                                     | Carbon.<br>Per cent. |
|-------------------------------------------------------------------------------------|----------------------|
| Combustion of evolved gases from acid solution of potassium cupric chloride.....    | 0.002                |
| Combustion of residue from flask.....                                               | 1.257                |
| Combustion of evolved gases from neutral solution of potassium cupric chloride..... | 0.012                |
| Combustion of residue from flask.....                                               | 1.252                |
| Direct combustion of drillings.....                                                 | 1.280                |
| Solution in acid potassium cupric chloride and combustion of residue .....          | 1.267                |

These samples were all ordinary carbon steels, but as experience has shown me that on chrome-tungsten steels the direct combustion method gave much higher results than the combustion of the residue from treatment with potassium cupric chloride, a high chrome-tungsten steel was treated with the following result:—

|                                                                                  | Carbon.<br>Per cent. |
|----------------------------------------------------------------------------------|----------------------|
| Combustion of evolved gases from acid solution of potassium cupric chloride..... | 0.002                |
| Combustion of residue from flask .....                                           | 0.543                |
| Direct combustion of drillings.....                                              | 0.692                |
| Solution in acid potassium cupric chloride and combustion of residue .....       | 0.567                |

The results of these experiments lead me to the conclusion that the opinion I expressed in 1891,\* that there was no evolution of hydrocarbons when steel was treated with a copper salt, was absolutely correct. There is abundant evidence to show that, as I then stated, there is a "solution of the carbonaceous matter by the alkaline salts in the absence of an excess of acid," which is not precipitated by the subsequent addition of acid. The agreement in the results obtained by the direct combustion process and the combustion of the residue from the solution of the steel in acid potassium cupric chloride is so very close that I think that either method may be considered capable of yielding correct results. I now use the direct combustion method practically to the exclusion of all others, because it requires less work, and the results can be obtained in a shorter length of time. I am, therefore, in this conclusion heartily in accord with Mr. Stead; but by using a platinum tube I find no difficulty in obtaining correct results, no matter how thick the drillings may be, for I have made a number of determinations by burning coarse drillings directly and breaking up portions of the same lot of drillings until they passed through a fine sieve and then burning them, obtaining results rarely differing more than 0.005 per cent.

\*In this case the absorption apparatus lost weight.

\*Journal of Analytical and Applied Chemistry, vol. 4, p. 121.

I made several determinations by the Swedish direct combustion method, but did not obtain results sufficiently accurate to repay me for the trouble and work involved. Perhaps if I had had more time, or if I had been forced to use this process because the others were not available, I might have been more successful. Mr. Dillner's assertion that the direct combustion method is not suitable for pig irons does not accord with my experience. By mixing the sample of pig iron with an equal weight of low carbon steel or electrolytic iron, I have had no difficulty in getting results that agreed perfectly with those obtained by solution in potassium cupric chloride and combustion of the residue. This is equally true in regard to ferro-chrome and all other iron or steel alloys with which I have had experience.

The secret of success in this process is the rapid heating and combustion of the steel, for the heat furnished by the oxidation of the metal is sufficient not only thoroughly to oxidize the material, but to melt the resulting oxide into globules. It occasionally happens that the melted oxide runs through the bed of alumina and fuses to the bottom of the boat, to which it adheres so closely that it can be detached only by melting potassium bisulphate for a long time in the boat. The thin platinum cover which I use to prevent the spattering of the oxide on the inside of the tube is frequently perforated by the fused material.

The method is used in several large steel works, where one operator with four tubes makes as many as forty combustions in a day.

I have been informed by Mr. Stead that his results and researches fully confirm the fact that there is no evolution of hydrocarbons when steel is treated with copper salt in the manner described in the original report, and that later investigations have proved that the direct combustion method is par excellence the best and most accurate for the determination of carbon in steel.

## PERSONAL AND GENERAL.

Mr. O. N. Scott has returned from a professional visit to Madoc, Hastings County, Ont.

Mr. Elias Rogers, president of the Crow's Nest Pass Coal Company, is to visit British Columbia early in July.

Dr. A. E. Barlow, who is superintending prospecting and development operations on the claims of the Miller Lake syndicate, Miller Lake, is ill in Montreal.

Mr. F. H. Sexton, director of Technical Education, Halifax, N.S., was in Toronto early in June. Mr. Sexton is travelling in the interests of the new Technical College.

Mr. C. J. Tompkins, late of the Accounting Department of the Dominion Coal Company, has been appointed Secretary-Treasurer of the Imperial Coal Company, Frank, Alta.

Messrs. Burr & Fergusson, civil, hydraulic and mining engineers, announce that they have opened offices in suite 216-217, Loo Building, corner Hastings and Abbott streets, Vancouver, B.C.

Mr. R. G. Edwards Leckie returned on June 18th from a visit to Vancouver. He is now on his way back to British Columbia to spend some time in looking over mining properties in that province.



"*Sic Semper Tyrannis*. The engagement is announced of Miss Frances Muriel Cronyn to Mr. H. E. T. Haultain, son of the late Major-General Haultain. The wedding will take place in September.

At a meeting of the Lake Superior Corporation held in New York on June 11, Mr. Charles D. Warren, of Toronto, was elected president and Mr. T. J. Drummond, of Montreal, second vice-president.

Mr. E. S. Moore, formerly identified with the Ontario Bureau of Mines, has taken his Ph.D., *summa cum laude*, at the University of Chicago. He has accepted the appointment of Professor in Geology in the Pennsylvania State College.

Mr. R. B. McKay, who graduated from the School of Mining, Kingston, in 1904, is visiting Cobalt. For the past five years Mr. McKay has been engaged in contract mine surveying in the gold camps of British Columbia and Nevada. He is now making Cobalt his temporary headquarters.

Mr. Angus W. MacDonald, who for the past two years has filled the position of employment agent for the Dominion Coal Company, has been appointed general superintendent of the Dominion Coal Company, at Lethbridge, Alta. He will assume his official duties on the 1st of July.

The resignation of Mr. J. Obalski from the position of Superintendent of Mines for the Province of Quebec, has just been announced. Mr. Obalski will take up private practice with headquarters in Montreal. His numerous friends throughout Canada will wish him continued prosperity. For many years Mr. Obalski has been a prominent and useful member of the Canadian Mining Institute and he was this year elected vice-president.

Dr. Henry M. Ami, after 28 years of continuous and faithful service on the staff of the Geological Survey of Canada, retires on July 1. Dr. Ami's health has not been as satisfactory of late as his friends would wish, and his physician has advised him to discontinue his regular duties. Dr. Ami's early training was received at Ottawa. At McGill University he studied for four years under Sir William Dawson. Since his graduation he has been identified with the Geological Survey. His work has received recognition from foreign scientific bodies. He is a fellow of the Geological Society of London, and of similar bodies in Switzerland and the United States.

Members of the Canadian Mining Institute who were able to be present at the Montreal meeting last March, will remember with unmixed pleasure the several talks given by Dr. A. C. Lane, State Geologist of Michigan. The whimsical humor that tinged many of Dr. Lane's utterances was thrown into relief by an undercurrent of practical seriousness and sane idealism. Like Dr. Kemp, he used his wit not wantonly but well. It has just been announced that Dr. Lane is to leave the Michigan Geological Survey. He has accepted an appointment at Tufts College, where, naturally, a wider sphere of work will be assured. Dr. Lane's name, however, will always be associated with the geology of the Lake Superior region. He is, and has been, one of that thoughtful school of geologists who succeed in connecting geology with mining. We wish him all success in his new appointment.

## Correspondence.

Editor Canadian Mining Journal:

Sir,—Your special correspondent from Glace Bay in your issue of May 15th, in his elaborate defence of the Dominion Coal Company's hostility to reciprocity in coal, bears the earmarks of being official and authoritative, and his production, therefore, may be considered as presenting the most favourable view of the company's course of procedure.

The writer summons Hon. Robert Drummond to his aid, and quotes that gentleman's latest revised opinion that Cape Breton coal cannot compete with West Virginia in New England, and he fortifies his opinion by declaring that "Mr. Drummond knows what he is talking about when on the subject of coal." Would "Glace Bay" guarantee that Mr. Drummond knew what he was talking about when he used to assert directly the contrary of what he now states? Was his education incomplete when he formerly extolled reciprocity as the salvation of the Nova Scotia trade, and did he only graduate as a coal expert when he fell under the tuition of the Dominion Coal Company?

Mr. Drummond is expected to be somewhat responsible for his utterances in the Legislative Council. In his speech on 29th March, 1893, when the Whitney Syndicate matter was up, Mr. Drummond argued strenuously (1) there could be no coal combine, (2) there could be no material increase in prices, (3) that Nova Scotia could retain the Quebec market in spite of the remission of duties, and finally, (4) "with the duty removed there would be no trouble whatever in sending coal into the United States market." His opinion was so strong on that point that he even hazarded the opinion that if there were facilities for receiving it "we could send it now in spite of the duty."

Can Mr. Drummond now turn around and convince us that all he has written and spoken about coal markets until a recent date is balderdash and humbug? To-day he ridicules those who believe in an open market as "credulous or deceitful." It is fair to ask which was he during the many years when he promulgated the doctrine of reciprocity? "Glace Bay" quotes him as stating: "At the present time West Virginia coal is selling f.o.b. Boston at \$2.30 per ton, and on cars at \$3.00." Such figures have no basis of fact whatever. The Coal Trade Journal, of New York, on 12th May (page 364) quotes coal at Mystic at \$3.15 and upwards for spot business, and New River and Pocahontas on cars at a higher rate. On the 19th, the same excellent authority says: "George's Creek operators are hard hit, the same as the Pennsylvania operators, but they are maintaining prices fairly well on a basis of \$3.35 to \$3.50 in cars at Mystic. . . . Some of the larger shippers continue to maintain a price on the basis of \$2.50 f.o.b. shipping point." Thus the Trade Journal pretty effectually disposes of Mr. Drummond's quotations. For a number of years the Dominion Coal Company supplied the Boston and Maine Railway at Boston with steam coal at \$2.80 against 67 cents duty. Compare the net price (\$2.13) with the present low prices there, which make a margin of at least one dollar per ton in favor of Cape Breton coal, and a larger margin when brisk times give an upward tendency in prices.

The grand objection of the Dominion Coal Company to reciprocity is the alleged lack of discharging facilities in New England and the necessity of creating them. "Glace Bay" demands: "Would any sane Board of Directors be justified in expending huge sums . . . to



provide costly discharging facilities?" From which we are left to infer that the coal people in New England are behind the times, and still hoist coal with a tub, block and pulley! I do not think it would surprise "Glace Bay" a bit to be informed that some of the best coal-discharging plants in the world are to be found in New England, because the Dominion Coal Company is constantly using some of them. There is no danger that the American coal operators will shut out Cape Breton coal from their use, because, except in one instance, they are not owned by the operators at all, but by local dealers, who always welcome healthy competition, which is said to be the life of trade. Thus the huge bugbear to reciprocity raised by the officials of the Coal Company vanishes into thin air!

"Glace Bay" asks us to believe that the Dominion Coal Company is a benevolent institution operated in the public welfare. He asserts it "is a beneficent business enterprise that has greatly increased the prosperity of the country; . . . that the incorporation of that company was the inception of the greatest impetus ever given to the Maritime Provinces." "Jumping" the price of coal up (say 50 per cent.) is doubtless an instance of the "beneficent" policy of the company to promote the public prosperity and welfare! The jump in price is fully endorsed and justified by "Glace Bay," who admonishes me to learn that it is proper and right to salt the home market, in the advice that I should "take an elementary course in the law of trade and learn how it is that Canadian cheese and Nova Scotia apples can be purchased for less in London than in Sydney."

A knowledge of trade seems not so much lacking as an appreciation somewhere else of sound business morals. If the coal and other minerals of the province are owned by our people, they ought to be operated more in their interests than in the interests of outside communities. If, however, corporations and combines have succeeded in ousting them from their heritage and can defy them, they might as well submit and pay the tribute that brigands in all ages have demanded.

This province wants cheap coal for home consumption. What benefit is it to mine cheap coal for outside communities? If an expansion of the coal trade from two to five millions of tons means dear coal at home and cheap abroad, the less our people have of it the better. If our coal fields are a provincial asset destined to impoverish our people in order to increase the wealth and prosperity of others, our coal mines had better be closed.

To skin home consumers of coal to the limit and call it "beneficent" is a variety of benevolence worthy of Dick Turpin, who, "going through" the hapless wayfarer, bids him to kindly remember him for sparing his life.

The collapse of the Dominion Iron and Steel Company would have been an enormous misfortune to thousands of people financially interested, yet that was the "beneficent" result aimed at by the Coal Company when it refused to supply that company with coal at any price, and then, when forced to renew the supply, raised the price from \$1.28 to \$3.05!

Hon. Mr. Drummond, "who knows what he is talking about," etc., did not, before his conversion, view

the "jump" in prices as a beneficent act. He wrote on 26th May, 1905:—

"I have all along since 1901 maintained that the operators made a great mistake in so largely increasing the price to coal consumers. . . . The operators jumped the price too much and too quickly."

"Glace Bay" quite correctly sets forth the conditions of mining by the Dominion Coal Company, which he alleges "cannot be excelled on this continent. . . . It possesses what is probably one of the most valuable bituminous coal deposits in the world, and has a plant which always astonishes visiting engineers by reason of its completeness and extent."

Why, then, fear West Virginia coal in neutral markets?

I ask of what commercial value is any industry that cannot stand alone—that requires to be bolstered up by protective duties to give it a high-priced market? Why should "one of the most valuable coal deposits in the world" fear competition in its own home market against rivals handicapped by hundreds of miles of inland rail carriage? Why should the earnings of other industrial classes have to come to its aid to keep it alive?

The capital of the company is \$23,000,000, consisting of \$5,000,000 of 5 per cent. bonds, \$3,000,000 of preferred stock and \$15,000,000 of common stock. The latter was originally issued as a sort of bonus, so that the real capital is \$8,000,000, the interest on which is \$460,000 per annum. The average annual net earnings of the company may be set down briefly as \$1,800,000, which is about 23 per cent. on the capital originally invested. About two-thirds of this enormous income, deducting interest, is wrung from the people of Nova Scotia. The Coal Company's employees number about 5,200, only 2,600 of whom are skilled miners. To keep these employed at good wages Dominion Coal advocates allege that high prices for coal are necessary. Assuming that the people of the province pay only \$520,000 above their legitimate coal bill—and it is much more—the other classes in the community, the farmers, lumbermen, fishermen, gold miners, mechanics, etc., are paying \$100 per head of the employees to sustain the coal industry, over and above what they paid previously to 1900! Does this enormous sum reach men in the coal pits? Not a cent of it. The company puts its coal on the cars for about \$1.20 per ton. This includes all labor bills. The miner receives not one cent more whether sales are made at \$1.28 per ton or for \$3.05 per ton. It is all the same to him. Therefore the high prices extorted by the combine on the plea of wages is pure charlatanism.

W. C. MILNER,  
Secretary Free Coal League.

May 31st.



## SPECIAL CORRESPONDENCE

## NOVA SCOTIA.

## Glace Bay, N.S., 18th June, 1909.—Exhaust Steam Turbines.

—What will be, we believe, the first exhaust steam turbine engine in Canada is shortly to be erected in the Central Electric Power House of the Dominion Coal Company at Glace Bay. For several years past exhaust-steam turbines have been in successful use on the continent of Europe, and they have come into especial prominence in colliery work in the Westphalian coal-field of Germany. In recent years it has been found possible to introduce very great economies in boiler-coal consumption at collieries, and one does not often find to-day that the best coal goes to the fires, as too often it used to do in the old days. Nevertheless the peculiar nature of colliery power demands have not conduced to the most economical use of steam, particularly in the case of large hoisting engines, and the modern exhaust-steam turbine seems particularly adapted to meet such conditions. At the present time many of the collieries in England and Scotland are installing turbo-condenser plants and their future extended use seems assured.

The plant to be installed at Glace Bay will consist of one 1,000 k.w. generating unit. The turbine will be of the Rateau design, impulse type, and will utilize exhaust-steam at about atmospheric pressure, or 15 lbs. absolute. It is not yet decided whether the condensers will be jet condensers or barometric type. The circulating water will be taken from a large natural reservoir adjoining No. 2 Colliery. The single generating unit referred to will not utilize the whole of the exhaust steam which



No. 12 Bankhead, Dominion Coal Co., Glace Bay, N.S.

is available at No. 2 Colliery, and if the projected plant proves economical it is expected that another unit will be added.

The current generated will be conveyed by high tension transmission line to the group of new collieries now in course of development in the Lingan-Victoria District. The course of the pole-line will be across Lingan Bar, and the line generally will be very substantially built in order to withstand the high winds which sweep across this Bar in the winter time. The current will be stepped-up to 20,000 volts, and delivered at the collieries at this voltage. The distance from the generating station to the Lingan collieries is about nine miles.

The power at No. 12 Colliery, which is the first of the new group, will be largely steam, but at the other collieries it is expected that all the auxiliary surface engines, such as screen-engines, fan-engines, etc., will be electrically driven. It is also intended to deal with the mine water by means of electrically driven pumps, and the current will be taken underground through transmission boreholes as is the practice at the existing collieries. For the present, at any rate, the haulage will be driven by steam-power. Whether electrically driven haulages will be installed later will depend on the local conditions as they develop, but a certain amount of auxiliary, steam-power will have to be provided at these collieries, or otherwise they would be too entirely dependent on the transmission line.

So far as we are aware no use has as yet been made in this country of small electrically-driven rotary air compressors

operated underground by transmission lines from the surface. Where electric current can be transmitted through boreholes of a convenient depth this is an economical method of driving coal-cutting machinery, as it saves the expensive compressed-air mains which are otherwise necessary, and it further avoids the necessity of taking electric current into the coal face.

**The U.S. Senate and Nova Scotian Coal.**—The Washington Congressional Record of June 8th contains a speech of the Hon Stephen B. Elkins, Senator for West Virginia, during the debate on tariff rates on coal and petroleum which took place on the 2nd of June. Following are some of the "facts" which Senator Elkins told the Senate about Nova Scotian coal, which we cannot do better than quote as they were spoken: "Nova Scotia," said the Senator for West Virginia, "has about a thousand miles square of coal, containing four veins of coal whose average thickness is about ten feet, making about six thousand million tons of coal, two-thirds of which is as good as West Virginia coal." It would be interesting to know where this valuable coal deposit is situated in Nova Scotia. The particulars given do not agree with any coalfield we have ever heard of in this Province, except the remarkable areas which are controlled by Dr. Hugo von Hagen. We have often wondered where the coal was coming from to fulfil that five million ton contract which the shareholders of the Great Northern Coal Company were told had been closed for delivery in 1909. It is quite evident that there must be a coalfield in Nova Scotia known to certain persons in the United States which our Canadian Geological Survey has completely overlooked.

Senator Elkins gives a tabular statement of analyses of various coal seams said to be worked by the Dominion Coal Company. They make a surprising list, being as follows:

|               |               |
|---------------|---------------|
| Victoria      | Gowrie        |
| Springhill    | Caledonia     |
| Acadia        | Reserve       |
| Intercolonial | Lingan        |
| Reserve       | International |
| Nova Scotia   | Gardner       |

We always knew the Dominion Coal Company had a fine property containing numerous seams, but it may be news to the shareholders of this company to know how extensive their property really is.

What is really the most astonishing part of this extraordinary speech was Senator Elkins' assertion that the U.S. Government had been defrauded to the extent of \$1,000,000 of duties caused by evasion of the law by the Nova Scotian operators. The Senator stated "most of the coal imported as slack (from Nova Scotia) was ordinary coal, and should have paid a duty of 67 cents instead of 15 cents. . . . To make this slack question clearer I will go more into detail. It seems that in loading the Nova Scotia coal after it was mined into the railway cars it was dropped from an unusual height. This broke up the coal considerably. Then in unloading it into the boats taking it to Boston it was passed through a tube 60 feet long, with breakers. This also broke up the coal, so that by the time it reached Boston it would nearly all pass through a half-inch screen, and therefore most of it was sent down as slack by the Custom House officer and paid only 15 cents a ton duty. Most of all these importations were made by the New England Gas Company, which has 40 bye-product coke ovens near Boston, and the finer the coal the better it is suited for making coke so this company not only got its coal in on a 15-cent duty but it was prepared just to suit its purpose.



This extract is worthy of the Secretary of the Free Coal League at his best. The reference to the "tube 60 feet long, with breakers" rather puzzles us. We gather that someone has been amusing himself at the Senator's expense. Perhaps, however, the reference is to the Robins belt-conveyor at Louisbourg Pier which is used to load slack coal into vessels. This conveyor is about 600 feet long, and is used to take coal from the slack pocket to the hatch, and has a loading capacity of 700 tons per hour.

The facts of the case are these: The Dominion Coal Company has a contract with the New England Gas Company to supply slack coal for use in the coke ovens at Everett. This coal is all slack that is taken from under the screens in the ordinary process of screening, and it is only because of the fact that it is slack coal that the Dominion Coal Company has not sent a pound of round coal to the New England States since the spring of 1906, nor are they likely to.

Senator Elkins gives some figures to show the great importance of the coal industry of the United States, which we quote and take them as correct, for it is but reasonable to suppose that his figures with regard to the United States will be accurate, notwithstanding the fairy tale about Nova Scotia with which the Senate was amused. In 1908—a dull year—the coal production was 419,000,000 tons, worth \$500,000,000 at the mouth of the mine. If the money involved in transportation be added the sum involved in this great industry is \$800,000,000, and three million people depend upon it directly for a living. Then the Senator speaks of the production of Nova Scotia as being 5,800,000 tons per annum, and states in another part of his speech that with her present development Nova Scotia cannot supply much more coal than she now does. After this statement the Senator gets off the following doleful prophecy: "There are Americans and Canadians waiting to see if coal is put on the free list to buy coal lands in Canada, and if they should, and open new mines, they will ultimately take the New England market, I think, except for the very best quality of coal, and in a few years take all the New England market. The result of this would be so disastrous, so ruinous, and demoralizing to West Virginia, Maryland, and Eastern Pennsylvania, that these states can never consent to the lowering of duty on coal." Truly the United States must be in a parlous condition. The entire Canadian coal production to-day is ten million tons per annum, or expressed as a fraction it is one forty-one-millionth of that of the United States, and if reciprocity in coal should have occurred the result to the States will we are told be 'disastrous, ruinous and demoralizing!' How very consistent!

If Canadian coal lands appreciate in value and contents as we have known them to do when bought by certain American citizens we do not wonder that Canadian competition looms so large in the eyes of the Senators. The prospectus of the Great Northern Coal Company read as follows, in part: "The property owned by this company is very valuable. It consists of three square miles in the heart of Cumberland County, which is famous as the largest coal district in Nova Scotia. Each square mile contains about 37,000,000 tons of coal, or in all about one hundred and eleven million tons (111,000,000 tons). Figuring this coal at 11 cents per ton, which is the value given coal in the ground, gives this property a cash value of \$12,200,000. Twelve million two hundred thousand dollars. Think of it! This means that every share of stock has nearly \$500 back of it. It means that the Company will be mining coal when our grandchildren are married one hundred or two hundred years from now." This is the description of a certain Nova Scotian coal property by a gentleman who advertises as Henry N. Roach, 373 Fifth Avenue, New York, and who publishes a weekly newspaper known as "Roach's Financial Facts." A description of the same property by a Nova Scotian mining engineer says "in my opinion it would require a very large outlay to put this mine

in condition for a daily output of 300 tons, and such a development would not be warranted by the present holdings." This same mine produced in 1908 the large output of 2,726 tons, of which amount the former owners raised 1,287 tons.

Comparisons are odious, but we feel bound to remark that a great deal of the information which is disseminated in the United States with reference to Canada is, shall we say, "roachy" in character.

#### QUEBEC.

Mr. J. E. Hardman, S.B., of Montreal, was in Thetford recently, looking over some Asbestos ground for a client.

The Montreal fiscal agents of the Compton Gold Dredging Co., having failed to make good on their agreement to provide funds for a dredge, by May 1, Kennedy & House, of Beebe, are now calling for the return of their property, as other parties are ready to take it up and put on a dredge this season.

It is reported that the Eustis people are about to re-open the nickel property at Brampton Lake.

The asbestos Merger, and the sale of a few properties has had the usual effect, namely, farmers having a show of serpentine, or hornblende, expect to get anywhere from \$25,000 to \$100,000 for a few acres, while one with any real asbestos goes up out of sight. And there will be the usual result. It is one of the unfortunate things about mining—people will lose their heads, eventually be disappointed and blame anything and everything for their own folly. We have yet to see what the ultimate result of the merger with its \$25,000,000 capitalization will be.

Meanwhile, prices are on the aeroplane. The writer had an option on 100 acres last season for \$1,500, and allowed it to expire. Now the owner has leased it for \$10,000 and gets \$100 per month during life of the option. Truly, there's a time to catch bears.

The Eastern Canada Smelter Co., which has an option on Mr. J. McDonald's copper property in Weedon, is sinking a new shaft. Some handsome ore from the property can be seen in the Company's office, Sun Life Building.

A meeting of the Directors of the Eastern Canada Mines Company was held recently and properties offered the Company discussed, and several declined. Plans were made for taking over of some promising claims, and the business of the Company put on a satisfactory basis.

The Company has a deal in prospect on one of its holdings, Le Chat Noir, a large placer.

Mr. Geo. Lewis, M.E., and Mr. C. A. Parsons arrived in Sherbrooke, June 15, and with Mr. Kenneth E. Kennedy drove to the property near Little Lake, recently purchased from Mr. Parsons by New York people. Mr. Lewis is here for the purpose of advising on the best means of working the placer ground, and also of examining the quartz veins on the property.

#### ONTARIO.

Cobalt.—On June 4 a general meeting of the shareholders of the Temiscaming & Hudson Bay Mine was held to discuss a place for the recapitalization of the company. It is proposed to form a new company having a capital of from \$3,500,000 to \$5,000,000, the shares being of a par value of \$1.00. The issued stock of the present company is only 7,761 shares of a par value of \$1.00 each, but the true value of each share is so great that the stockholders have a commodity that, while of



great value is not easily disposed of to advantage. There seems to be a general feeling in favor of some scheme of recapitalization whereby the shareholders will have certificates that may easily be bought or sold on the exchange. Although no definite arrangement was decided upon at the general meeting it would not be surprising if some action were taken in the near future. Up to date this company has returned to the shareholders, dividends to the extent of 13,300 per cent. on the issued capital.

At the Ophir Mine the foundation for the compressor is finished and the compressor will probably be in place by about June 8. The boilers are being bricked in and the management expect to have the plant in running order about June 21.

The shaft of the Hargraves has reached a depth of 275 feet, and at this level a cross-cut will be driven. Some work has also been done at the 75 and 175 foot level, but up to date good silver values have not been encountered.

The directors of the Trinity Mining Company have decided to go into liquidation. This company owns two claims in Coleman Township.

The values have given out in the new vein at the Beaver, at a point where a change in direction of the vein occurred. This, however, is a common thing with the veins in this locality and the management expect to get the values again in a short distance. The diamond drills working in the mine have struck two new calcite veins which have not been found as yet to carry silver values.

There have been two accidents within a week, caused by drilling into missed holes, whereby four men were very seriously injured. It is too much to say that a more rigid mine inspection would have prevented these accidents, but it is undoubtedly true that it would prevent some of the fatalities occurring. The inspection given the Cobalt camp is excellent, so far as it goes, but the inspector has altogether too much work to do, to give this district the attention it deserves. A permanent inspector for the camp is badly needed, and the Government is greatly to be censured that one has not been appointed before this. Neglect of this matter has already caused the loss of too many lives.

The Nipissing Central Railroad Company has completed their surveys for the electric line to be run between Cobalt and Haileybury, and the contract for building has been let to the Nova Scotia Construction Company, of Sydney, C.B. Work will be started at once and it is estimated that the cost will be about \$125,000. Power will probably be obtained from one of the companies bringing power into the town.

The cyanide plant of Buffalo Mine, to be operated in connection with the present mill, is about completed and will probably be started about the 1st of July. For the fiscal year ending May 10th the average assay of the mill rock was 43 ounces and a total saving of 86.4 per cent. was made. The average value of the concentrates was 1,500 ounces. Commencing with July a complete monthly statement will be issued to the stockholders giving the details of the mining operations and cost and profit of the ore milled and mined.

A new company known as the Lang Caswell Cobalt Mines Company, Limited, has been formed to take over the holdings of the Lang Caswell Syndicate, which consist of 440 acres in the first concession of Lorraine. The capital of the new company is \$1,500,000, all of which was subscribed for by the directors at a meeting held a short time ago. A shaft, sunk to a depth of over 60 feet is being continued to the 100-foot level. Another shaft will be sunk to the same depth on the best showing on No. 1 property, and these two workings will be connected by a cross cut.

The Pontiac Mine has shut down for the time being owing to the fact that the workings have progressed beyond the point

where steam can be successfully used for the drills. It is understood that negotiations are under way for the purchase of air from the King Edward or the Silver Cross Mines, and if such are satisfactorily completed, work may be resumed. In the meantime surface prospecting is being carried on.

Mr. M. McCallum has resigned his position as superintendent of the Pan Silver and he will be succeeded in that capacity by Mr. J. A. Skeene. The No. 4 shaft has reached a depth of 215 feet and at this point a station is being cut. A cross cut will be run to tap No. 4 vein.

The Silver Cliff Mine has a force of 30 men at work doing development on No. 1 and 2 veins. These workings will probably be connected about the last of June. Work of any great extent will not be undertaken until the hydraulic air is ready.

A strike has been made on the No. 7 vein of the King Edward in the raise, 45 feet above the 150 foot level where the vein widened from a mere stringer to between 2 to 4 inches of high grade ore. No. 7 vein runs parallel to No. 5, on which a new ore body was discovered a short time ago. A prospecting tunnel is being driven into the hill from the side of Cross Lake, but nothing of value has as yet been discovered. The mill is putting through about 20 tons of ore a day.

The Townsite Mine is to open up again about the 1st of July. The necessary capital was raised by the issue of debentures to the amount of \$100,000, which were largely subscribed for in England.

The Nancy Helen Mine is getting ready to commence their diamond drilling operations from the 190-foot level of the main shaft. Other underground operations have been suspended in the meantime.

The main shaft of the Wettlaufer Mine in South Lorraine has been sunk 70 feet, and in the first 60 feet \$15,000 worth of ore was taken out.

The capacity of the mill at the Reddick Mine at Larder Lake will be increased by the addition of a tube mill. Twenty men are employed in sinking the shaft, trenching and cutting timber. At the Cleopatra Mine, a large force of men will be employed this summer in prospecting the surface. It is believed that Mr. George Taunt, who is a prominent stockholder in the Chesterfield and the Lucky Boys, is trying to arrange for a lease of the mill on the Harris Maxwell for the purpose of making a mill run of the ore from the former properties.

There is considerable disappointment around Gowganda, as there is not the number of people going into the country that was expected. On the whole the Miller, Everett and Shanty Lake sections seem to be the best and there is a good deal of work being done on the properties there. The Everett Silver Cobalt Syndicate have erected two permanent camps at Everett Lake and are employing 100 men. This company has twenty-one claims that were purchased from the Miller Lake & Everett Mines Co., Limited. A find of silver has been made on Cartwright's Claim, adjoining the Blackburn Mine on Everett Lake. The vein was traced from the latter property. The Blackburn is one of the most promising mines in the new district, and now has a complete plant running. On McRae's property at Shanty Lake there is silver showing in eleven veins, and considerable development work has been done. The German Development Company has a force of men working on their properties at Shanty Lake. On the Burns property, in the same section, a new two-inch vein of high-grade ore has been encountered. On June the 5th there was a rush to Smoothwater Lake where silver was reported to have been found. There is only a small diabase area, however, and there is a good deal of staking on the quartzite. The Welcome Lake section is receiving considerable attention at the present time and several promising discoveries are reported to have been



made. There was also a small rush to Duncan's Lake but most of the prospectors returned not greatly enthused over the prospects. A small rush has taken place to Rapid Lake, which is to the north of Temagami. The Government is strictly enforcing the law that permission must be obtained before doing any work and the filing of work will not be recorded unless such permission has been granted. So far the stakers around Shining Tree Lake have been refused permission to work on account of the value of the pine. There are now two passenger canoe companies operating between Stoney Creek portage and Gowganda, carrying passengers in one day. The rates are \$9.00 for the return trip. Stoney Creek portage is thirteen miles above Elk Lake and is reached by gasoline launches. One of these companies, known as the United Mining & Transportation Co., also handles freight, and they now have eighteen large freight canoes in service. The rate for supplies is \$7.50 per 100 pounds. This same company has two teams of horses for handling freight on the portage into the east branch of the Montreal River. The new line of boats, known as J. R. Booth's line, operating between Latchford and Elk Lake in competition with the Upper Ontario Navigation Company, has rendered the service much better for passengers. The Government is building a wagon road between Elk Lake and Gowganda, and the preliminary surveys have been completed. It is estimated that the distance will be cut down about seven miles and also that the muskegs and heavy grades will be avoided. It will not be long before mail will be brought into Gowganda by pack horses. At present only first-class mail is carried. The first newspapers for three months arrived in camp on June 10th. Mr. A. A. Cole, engineer for the railway commission, made a trip into the district to look into the resources to see if they warranted railway construction.

The town of Elk Lake has had a very rapid growth since last fall and it can supply more first-class hotel accommodation than Cobalt. Surveys have been made of Mountain Chutes to estimate the available power to supply the Elk Lake mines. Silver Lake, six miles to the west of Elk Lake, there are four five plants installed and running. The Big 6 at Miller Lake is now working part of its plant and it is expected that the rest will soon be running.

The directors of the Temiskaming Mine, at their meeting held a short time ago, decided not to declare the regular quarterly dividend of 6 per cent. They state that the Company intends to erect a concentrator with a capacity of from 75 to 100 tons a day. They also wish to build up a large cash and ore reserve. It is understood that the mine is rather short of ore.

New York parties have taken over the Monarch Claim, lying to the west of Sosagmaga Lake, and a force of men has been started doing surface prospecting. The claim consists of twenty acres.

The Silver Cliff Mine has been sold to Pittsburg capitalists. Captain Jeffrys, formerly of the Chambers-Ferland, will take charge of the operations.

During the coming summer the Coniagas will double the output of their present mill. Thirty stamps will be added and so the necessary tables. No addition will be necessary to the crushing and jigging end as the capacity is already 300 tons a day. The smelter at Thorold, which started to take custom ores a short time ago, is working up to its full capacity.

#### BRITISH COLUMBIA.

**The Boundary.**—It was in 1898 that the shade known as Dominion Copper interests took the first degree; later on the Montreal & Boston Consolidated took the floor, and put the concern through the second; in the fall of 1905 Salt Lake and

New York capitalists undertook to put on the good old third, and between the whole team the Dominion Copper certainly had quite a time of it. When old Dominion came in blindfolded for the third he had a prosperous sort of look, but a few whirls of the goat—or lamb—and he lost his coat of anticipated dividends; then off came the bright waistcoat of expected profits, and he tumbled into a ragged old coat of loss and increasing debt and was soon sliding down an incline to goodness knows where. The big bump occurred in Vancouver, B.C., on June 4th, when the property of the Dominion Company was bought by the Chas. Hayden interests of New York for \$261,500. This amount will not go far toward paying the \$800,000 outstanding bond issue and the interest thereon, to say nothing of the other debts of the company which will likely go begging, with the exception of the amount due the miners for wages, which the buyers of the property "consider" should be paid prior to anything else. It seems strange that the Protective Committee, if they had the backing they claimed, did not put in an appearance at the Vancouver sale, the property being bid in at only \$1,000 over the reserve price; the Hayden interests, represented by M. Weinman, being the only bidder. And then a short while ago it was said that one or two of the big Boundary consolidations had offered \$350,000 or over for the Dominion mines. They must have been observing some unwritten rule of mining etiquette when they did not get in and bid, and yet it may be that these big concerns have their hands full and do not wish to undertake the development work that ought to be done in these mines. It is taken for granted that a new company will be organized along the lines already set forth by the Reorganization Committee, to take over the property recently acquired, which comprises the Rawhide, Brooklyn, Stewwinder and Idaho claims, the Boundary Falls smelter, mining machinery, supplies, etc.

The Granby shipments are running about 20,000 tons per week. At the Grand Forks smelter four of the enlarged furnaces are now in operation, numbers three and four having been blown in a week or ten days ago. The altered furnaces are giving very good satisfaction, and the work of augmenting numbers five and six has been started. It is hoped that the whole battery of eight furnaces will have been gone over by October. Many small additions are made to the Granby plant each month working toward higher efficiency. An 8x12 triplex pump was placed on the 400-foot level of the mine last week, where it will serve the dual purpose of taking the water from the mine and forcing it to a supply tank 500 feet up the hill.

For the week ending June 12th the Snowshoe mine shipped 2,950 tons of ore, this being the largest week's shipments from this property this year. The Sally mine also appears on the shipping list with 23 tons to Trail smelter, making a total of 39 tons for this high-grade property since May 22nd.

It should certainly be gratifying to the mining interests of this Province to note the amount of work the Geological Survey of Canada is planning to do here this year. This work will be carried out on a broader scale than ever before, and in most instances the parties are already in the field. The Tulameen section of the Similkameen district, Phoenix, the Sloean, Sheep Creek, West Fork of Kettle River, Texada Island, Vancouver Island and the Hazelton section of Skeena River are to be given attention and data compiled that will be of inestimable value to future mining operations in the districts named.

It is stated that the capitalists for whom M. K. Rodgers has bonded the Nickel Plate group intend to operate the property on an up-to-date scale when arrangements are finally made. The property has been thoroughly sampled, and those interested have all the available data at hand to help them in planning for intelligent future work. The group consists of the Nickel Plate, Sunnyside and Woodland Fr. claims, and the 40-stamp mill is situated at the foot of the hill near Hedley. Some glory-



hole work has been done on the large lodes, this ore generally averaging \$14 per ton; some of the veins assay \$80 per ton, while frequently very rich pockets have been opened up.

**Rossland.**—The Le Roi 2, Ltd., has let a contract for the deepening of its main (Josie) shaft from the 900 to the 1,200 level. This work has not been undertaken without due study of conditions and much diamond drill exploration in the ground to be opened up. Rich ore bodies have been located below the 900-foot level in Le Roi 2 ground, and it is expected that similar ore will be opened up from the 1,200 level to that found in Le Roi ground at about this level. The work of sinking this 300 feet of shaft will cost over \$18,000.

Rumour is persistent that the Le Roi will resume work in the near future, but while it is understood Mr. McMillan is making good headway in London, it is not likely that work will be started on the proposed development for another month or two. A local syndicate has expressed its willingness to take over and work the Le Roi on a lease, but it is not likely that the Le Roi Company could afford to lease its mine at this time.

A rich-looking vein from two to three feet wide has been located on the War Eagle claim of the Consolidated group. It is probable that this vein upon development will prove as rich as the Peyton vein of the Le Roi and other very rich surface lodes that have been uncovered on that property, the claims of the Le Roi 2, Ltd., etc. Last week at the Consolidated smelter at Trail another large furnace was blown in, giving this plant four big copper furnaces in addition to its lead stacks. The expansive spirit of the Consolidated again made itself evident during the past week, when the Alice mine at Creston was secured by this concern. The Alice is a silver-lead mine of promise, and will prove a valuable acquisition to the mining and smelting operations of the Consolidated.

As we suggested at the end of last year, there has been a small increase in the metallic production of this province, while

the coal mines about held their ground. A preliminary report on the mineral production of Canada shows that the increase for the Dominion amounted to nearly half a million of dollars. Silver showed an increase of 72 per cent., for part of which increase the lead bounty may account, although it is shown that lead showed a slight falling off. The total output was a little over \$87,000,000. Gold showed an increase, most of this being taken from the lode mines of the Rossland-Trail Creek district. The copper increase was 14 per cent. the Boundary mines taking out seven millions pounds more than during the previous year. The lead, amounting to \$1,920,487, was all mined in British Columbia. The coal production is shown as 2,329,600 tons, value \$7,280,000, against 2,364,898 tons mined in 1907.

**Vancouver.**—There are several big syndicates that will do extensive development work on the rich copper deposits of Moresby Island this summer. The outlook for this district seems bright. The deposits are large, rich in copper, gold, and silver, and will flux very readily. The Japanese owners of the Ikeda group on Ikeda Bay were in a manner pioneers in this rich district. There are now 65 men working at this property nearly all Japanese. About 1,000 tons per day is being shipped to the Tyee smelter, Ladysmith, V.I., the freight rate being \$1.50 per ton. Average ore found at depth in the hill assays 7 per cent. copper and \$3.50 per ton in gold. The hand sorted ore carries 12 per cent. copper, \$5 gold, and as high as 60 oz silver per ton. The Granby people have interested themselves in a group of copper properties on the west coast of Moresby Island, as have also a couple of big American mining syndicates and if the values are found at depth as good, or anywhere near as high, as are now found on the surface, the Moresby Island district will be an important factor in the copper market in the not distant future.

## GENERAL MINING NEWS.

**Sydney, N.S.**—The Steel Company is making a new record at the blast furnaces and open hearths. For several days past three blast furnaces turned out over 900 tons a day. The open hearths produced nearly 14,000 tons the first half of the month. One furnace produced recently in one day of 24 hours 450 tons. All departments of the plant are running at high pressure and June is expected to be a big month.

### QUEBEC.

**Sherbrooke.**—A. W. G. Wilson, of the Mines Branch, Ottawa, is making Sherbrooke his summer headquarters. He is to report upon the mining properties and activities of the Eastern Townships.

The Ascot Copper Mine, south of Acton, was purchased some time ago from the Hon. Henry Aylmer. The property comprises 275 acres. It is being equipped with machinery. Mr. John McCaw, of Sherbrooke, is in charge. Very rich, self-fluxing copper ore is being worked.

### ONTARIO.

**Cobalt.**—Fifteen parcels of the Gillies limit were disposed of by tender for a total of \$74,000.

**Port Arthur.**—The Atikokan furnace is soon to be blown in. A new coke drawing machine has been installed by General Manager J. Dix Fraser.

**Madoc.**—There is promise of greatly renewed mining activity in and around Madoc and in outlying districts.

### SASKATCHEWAN.

Near Paynton a discovery of gold and silver was made early in June. A rush ensued at once. No particulars are yet to hand.

### ALBERTA.

**Strathcona.**—On Friday evening, June 11, two miners were severely burned by an explosion of gas in the Twin City coal mine.

### BRITISH COLUMBIA.

**Phoenix.**—The only bidder for the Dominion Copper properties at Phoenix was Charles Hayden, of New York. The sale took place at Vancouver on the morning of June 4th. Mr. Hayden's bid was \$261,500. This was accepted. The pro-



perties near Phoenix include the Brooklyn, Idaho, Stenwinder, Rawhide, and Mountain Rose mines. Mr. Hayden will operate these properties. In response to an enquiry concerning the unpaid wages of Dominion Copper workmen, Mr. Hayden telegraphed his assurance that these, as the most sacred of all debts, should certainly be paid in cash in full.

**Moyie.**—The tailings from the St. Eugene concentration at Moyie are being utilized by the C.P.R. for ballast.

**Rossland.**—A contract has been let for sinking the main shaft of the Le Roi No. 2 from the 900 foot to the 1,200 foot level. The dimensions of the tunnel will be 7 x 16. Sinking will progress at the rate of about 75 feet per month.

**Phoenix.**—The Granby Consolidated Company has presented three lots to the town of Phoenix, as a site for a large public

school. The building at present used is too small and is inconveniently near one of the company's ore crushers.

A company has been formed to develop the Buster mineral claim on the West Fork.

**Vancouver.**—On June 7 a shipment of bar silver from the Consolidated Smelter, Trail, B.C., passed through this port, en route to China. The value of the shipment is estimated at about \$30,000.

**Nelson.**—News has been received of the death of Mr. R. J. McPhee at Spokane, on June 13. Mr. McPhee was a native of Prince Edward Island. He was formerly an active figure in mining in Nelson and the Slocan.

## MINING NEWS OF THE WORLD.

### GREAT BRITAIN.

On May 28 the South Wales coal-owners distributed to all their workmen a notice terminating their contract of service on June 30th. This affects 150,000 men.

Scotch steelmakers in private conference have agreed to reduce ship plates and angles 10 shillings per ton for prompt delivery.

The position of the Scotch coal trade is most acute. Owners are arranging to enforce a reduction in wages of 12 1-2 per cent. The miners are holding out for a minimum rate of 6 shillings per day. Eighty thousand miners are involved in this dispute.

### AUSTRIA.

The Galician oil producers have entered into a contract with the Standard Oil Company, by which the latter have undertaken to build a number of reservoirs for raw oil. The Galician oilmen will pay a rent of £75,000 for four years, after which half the reservoirs will become their property and half will remain with the Standard Oil Company. The contract is very favorable to the Standard Oil Company, as the rent must be paid whether the tanks are full or empty.

### SOUTH AFRICA.

Thirty-five Rand companies report an increase of profits for May of £37,104.

Great activity continues on the Randfontein Estate. Large orders of machinery have been delivered. The western Rand Estate is to be operated on a large scale.

### MADAGASCAR.

The Madagascar Oil Development Company, a new Anglo-French petroleum undertaking, has been formed for the purpose of

exploiting the recently discovered oil-region on the west coast of Madagascar. The products will be imported free into France as Madagascar is a French Colony. Foreign producers have to pay a duty of 90 francs per ton on crude petroleum, and 120 francs per ton on refined.

### NEW ZEALAND.

The output of gold from New Zealand mines during May amounted to 46,525 ounces, valued at £185,271, as against 45,017 ounces, valued at £179,487, during the corresponding month last year. The output of silver was 175,958 ounces, valued at £17,492, as against 164,635 ounces, valued at £16,670 during May, 1908.

### UNITED STATES.

Cripple Creek district produced \$1,360,838 in gold during May. This yield came from 57,835 tons of ore, an average per ton of \$23.74. Apparently these returns are incomplete as no reports were received from Stratton's Independence mill.

Mining costs are being reduced to very favourable figures at Goldfield, Nevada. One company reports the following costs: Stopping, \$2.82 per ton; development, \$1.10 per ton; transportation 13.3c. per ton; milling \$2.44 per ton, total \$6.49 per ton.

The total production of gold in the Tonopah district, Nevada, for the week ending May 28, estimated to be about \$140,000.

A copper smelter, to cost one million dollars, is to be erected at Parker, Yuma County, Arizona.

The largest gold dredge yet constructed is being equipped at Mangold, Yuba County, California. It will cost, when completed, about \$200,000.

The Standard Oil Company has commenced oil-drilling operations at Oakland, Douglas County, Oregon. Leases have been secured on 30,000 acres of land.

The copper mines of Utah exceeded all previous records during the months of April and May. In each month the output of copper went over 10,000,000 pounds.

## COMPANY NOTES.

The International Nickel Co. has declared an initial dividend of 1 per cent. on the common stock, payable September 1. It is believed in well-informed quarters that the rate will be paid quarterly.

The Crown Reserve directors have declared the regular quarterly dividend of six per cent. and bonus of nine per cent. on the stock, payable July 15, to shareholders of record June 30. Books close from July 1 to July 15, inclusive.

During May the Nipissing Company mined ore of an estimated net value of \$151,930 and shipped ore of an estimated net value of \$168,224. This compares with a production of estimated net value of \$149,739 in April and estimated net shipments of \$96,492 in that month.

The Nipissing Mines Co. has declared the regular quarterly dividend of 3 per cent. and an extra dividend of 2 per cent., payable July 20th. Books close on June 30th and reopen July 15th. The statement submitted at the meeting showed a surplus as of June 14th of \$1,092,000, consisting of cash on hand, ore at the smelter, in transit and at the mines.

Following is the report of Manager Paul E. S. Couldrey on the Le Roi 2 for the month of April, which was issued from the London office of the company on May 25th:

The output for April was approximately 2,610 tons. Development work has been done as follows:—

**400 Foot Level.**—The 400 cross-cut was advanced a distance of 68.5 feet, and ore was drifted on for a distance of 54.5 feet. Total distance, 123 feet. The average assay met with was 1.21 oz. gold and 3.2 per cent. copper, over a width of 12 inches. Twelve samples were taken. The ore will probably be found to extend farther either into the foot or hanging wall than the above 12 inches would seem to indicate.

**900 Foot Level—Cutting Pocket.**—A drift of 45.5 feet was put in here to connect with place where bottom of pocket will be.

**East H. Intermediate Drift.**—This was advanced a distance of 71 feet and broke through into East H., No. stope. The average assay met with here and in the stope was .53 oz. gold and 3.8 per cent. copper, over a width of 1 foot 9 inches. Twenty samples were taken.

**301 Stope.**—This stope has broken through to tramway tunnel during the month. The average of samples taken was 1.12 oz. gold and 2.3 per cent. copper, over a width of 2 feet 3 inches. Thirty-four samples were taken.

**42 Stope.**—This stope is still very spotty, especially at the east end. As we get further up, however, we shall confine our attentions more to the good ore at the west end. Eighteen samples were taken, the average assay of which was .27 oz. gold and 1.1 per cent. copper, but the ore is too scattered to give any definite width.

**423 Stope.**—This stope, which has only been attacked in the level itself, and not taken out in the back up to the present, shows an average of 2.06 ozs. gold and 5.0 per cent. copper. Nineteen samples were taken and the average width over which they were taken was 3 feet 3 inches. There are several streaks lying side by side, however, and the total width of ground taken

out is very wide, being 22 feet at the east end with ore still showing in the footwall. The average assay taken across the whole width, including waste and everything, would of course be lower than the above, but the ore from here is quite easy to sort, and the grade of ore picked out after sorting should not be less than the above. This ore also exists on the 500, but there it is much shorter in length being cut off by two converging dykes.

**428 Stope.**—This is really a large raise which has been started so that a chute can be put in and work started at a later date for the ore met with in Diamond Drill Hole No. 160. One stringer about 6 inches wide assayed 1.14 oz. gold and 3.8 per cent. copper, but it pinched out almost immediately.

**Stope 32 (500).**—The waste pillar of ground met with in this stope is now giving way to good ore again. The average assay from the back of this stope was .96 oz. gold and 5.4 per cent. copper, over a width of 21 inches. Forty-two samples were taken.

**East H. No. 1 (500).**—There is a little more ore to be taken out of here yet and it may in one place go through to the 300 level. The average assay met with was .53 oz. gold and 3.8 per cent. copper over a width of 21 inches. Twenty samples were taken.

**702 Stope (700).**—No fresh ground was broken here, but stulls are being put in, and we hope to start breaking ore very soon.

**Shaft Timbering.**—This was completely finished on April 21, and the unloading pocket was started the same day. We shall push the work as rapidly as possible, and start sinking immediately afterwards. Two drills will be put in pocket raise as soon as there is room for them.

At a meeting of the directors of the Temiskaming Mining Company on June 12, at Haileybury, it was decided to pass the dividend for the current quarter. The directors at the meeting arranged for the erection of a concentrator on the company's property without delay.

The following official statement to the shareholders was issued afterwards, signed by B. E. Cartwright, R. T. Shillington, J. L. Wheeler, R. H. Cartwright, and Alex. Fasken:—

"In view of the fact that your directors have decided not to pay a dividend for the current quarter, they think it well to explain to the shareholders the present condition of the mine and outline the future policy.

"Your directors believe it to be in the best interests of the shareholders to build up a large cash reserve and ore reserve and take advantage of the low-grade ore already produced and being produced daily in development work and production of the high-grade ore.

"Our production of high-grade ore is being maintained, the ore bodies proving as rich as ever at the 250-foot level and by means of a winze to a depth of 300 feet.

"Up to date no revenue has been obtained from the low-grade ores, and at a conservative valuation the ores in the dumps ready for concentration, will net the company \$500,000, and in addition to this there are being produced an average of 100 tons per day of concentrating ores of an average net value of \$15 per ton.

"Your directors think that advantage should now be taken of the low-grade ores, and are proceeding to install a concentrating plant with a capacity of from 75 to 100 tons per day, at an estimated cost of from \$75,000 to \$100,000, and expect that the plant will be in full operation before the end of this year.



"The installation of the plant should add at least \$400,000 yearly to our net revenue, and there is sufficient ore in sight to maintain the output of the plant for many years to come.

"Your directors have the fullest confidence in the future earnings of the company, and invite all shareholders to make a personal inspection of the mine."

The following is the proposed plan under which the reorganization committee of the Dominion Copper company are now working. The committee, which purchased the property at the foreclosure sale, will transfer it to the New Dominion Copper company which will issue the following securities: \$500,000 of 6 per cent. 10 year income bonds, convertible into stock at par, \$5 per share; 250,000 shares of common stock of a par value of \$5 per share. Present bondholders will take new stock for their bonds on the basis of 210 shares of new stock for each \$1000 bond. This will absorb 168,000 shares of the new stock. Creditors will receive 20,000 shares of new stock in the proportion of 20 shares for each \$100. Present stockholders upon turning in their present stock and subscribing at par for the new bonds on the basis of one hundred dollars of bonds for each \$100 of present shares will receive in addition to the bonds subscribed for 10 shares of new stock for each 100 shares of present stock, this calling for 50,000 shares. Underwriters will receive 12,000 shares of the new stock which will account for the entire 250,000 shares.

The Dominion Coal Company has declared the regular quarterly dividend of one per cent in the common stock, payable July 2,

to stockholders of record June 18. Books close June 18 to July 2, inclusive.

At the Annual Meeting of the Chambers—Ferland Mining Co. The important items in the statement of assets were: Cash in bank, \$54,799; ore in transit, and at smelter, \$21,544; ore on hand \$15,257.

The statement showed a balance, including these items, of roughly, \$82,000. The property was stated to be in satisfactory shape, and nothing was said as to the prospect of a dividend. The Chambers-Ferland being in a condition of development, the payment of a dividend is still in the prospective.

The other business of the meeting was the re-election of the old board, as follows: W. C. Chambers, president; Harper Armstrong, vice-president; Alexander Fasken, secretary-treasurer; Arthur Ferland, W. B. Russell, George H. Sedgwick, and A. P. Struthers.

#### LA ROSE CONSOLIDATED MINES COMPANY.

A dividend at the rate of 3 per cent. for the quarter ending 31st May, 1909, and a bonus of 1 per cent. has been declared upon the outstanding capital stock of the company, and will be paid 20th July next to shareholders of record at the close of business on 1st July, 1909. By order of the Directors, the transfer books will be closed from the close of business on 1st July, 1909, and remain closed until 10 a.m. on 21st July, 1909.

Dated the 17th day of June, 1909.

LA ROSE CONSOLIDATED MINES COMPANY,

D. A. Dunlap, Secretary-Treasurer.

## STATISTICS AND RETURNS.

The Kerr Lake Mining Co. reports its output for May at 220,000 ounces of silver. The main drift on No 7 vein at the 150-foot level was driven 72 feet on a continuous pay streak, and the ore showing for this 72 feet is stated to be as good as any in the history of the mine. The pay averages ten inches in width, and is of the average high-grade ore. A new vein showing high silver values was discovered by trenching on the east side of the property.

#### COBALT ORE STATEMENT.

For the Week Ending June 12th, 1909.

|                                                  |           |
|--------------------------------------------------|-----------|
| Nipissing Mines, Am. Smltg. & R. Co., Denver.... | 61,400    |
| Nipissings Mines, Nipissing M. Co., Bergen J.... | 62,500    |
| Nipissing Mines, Am. Smltg. & R. Co., Denver.... | 65,480    |
| Nipissing Mines, Am. Smltg. & R. Co., Denver.... | 64,640    |
| Nipissing Mines, Am. Smltg. & R. Co., Denver.... | 66,130    |
|                                                  | 320,150   |
| Drummond Mine, Montreal R. & S. Co., T. Mills..  | 50,000    |
| Drummond Mine, Montreal R. & S. Co., T. Mills..  | 50,000    |
| Drummond Mine, Montreal R. & S. Co., T. Mills..  | 50,000    |
| Drummond Mine, Montreal R. & S. Co., T. Mills..  | 50,000    |
|                                                  | 200,000   |
| Buffalo Mines, Can. Copper Co., Copper Cliff.... | 49,300    |
| La Rose Mines, Am. Smelting & R. Co., Denver     | 65,000    |
| Kerr Lake, Am. Smltg. & R. Co., Perth Amboy....  | 58,900    |
| Right of Way, Montreal R. & S. Co., T. Mills.... | 85,729    |
| City of Cobalt, Am. Smltg. & R. Co., Perth Amboy | 53,000    |
| McKinley-Darragh, Am. Smlt. & R. Co., P. Amboy   | 58,500    |
| Crown Reserve, Can. Copper Co., Copper Cliff.... | 60,390    |
| Chambers-Ferland, Am. Smltg. & R. Co., Denver..  | 60,000    |
| Total . . . . .                                  | 1,010,969 |

#### COBALT ORE STATEMENT.

For the Week Ending June 19th, 1909

|                                                    |           |
|----------------------------------------------------|-----------|
| Nipissing Mine, Can. Copper Co., Copper Cliff....  | 64,920    |
| Nipissing Mine, Am. Smltg. & R. Co., Denver ....   | 61,550    |
| Nipissing Mine, Am. Smltg. & R. Co., Denver ....   | 61,550    |
| Nipissing Mine, Am. Smltg. & R. Co., Denver ....   | 85,100    |
| Nipissing Mine, Am. Smltg. & R. Co., Denver....    | 63,895    |
| Nipissing Mine, Am. Smltg. & R. Co., Denver ....   | 60,673    |
|                                                    | 397,688   |
| Crown Reserve, Penn. S. Co., Carnegie.....         | 43,200    |
| Crown Reserve, Can. Copper Co., Copper Cliff ....  | 59,400    |
| Crown Reserve, Beer-Sondheimer, New York.....      | 60,056    |
| Crown Reserve, Can. Copper Co., Copper Cliff....   | 60,757    |
|                                                    | 223,413   |
| La Rose Mine, Am. Smltg. & R. Co., Denver ....     | 65,000    |
| La Rose Mine, Can. Copper Co., Copper Cliff....    | 65,533    |
| La Rose Mine, Am. Smltg. & R. Co., Denver ....     | 65,158    |
|                                                    | 195,691   |
| Cobalt Central, Can. Copper Co., Copper Cliff .... | 55,000    |
| Temiskaming, Am. Smltg. & R. Co., Denver ....      | 52,800    |
| Buffalo Mine, Can. Copper Co., Copper Cliff.....   | 46,900    |
| Coniagas Mine, Coniagas R. Co., Thorold.....       | 61,700    |
| McKinley-Darragh, Am. Smlt. & R. Co., P. Amboy     | 59,362    |
| T. & H. B., Deloro M. & R. Co., Deloro .....       | 60,400    |
| City of Cobalt, Am. Smltg. & R. Co., Denver....    | 65,000    |
| Total . . . . .                                    | 1,217,954 |

The gold yield of New South Wales for the month of May was 13,041 ozs., valued at £42,039. The yield for the five months was 90,153 ozs., valued at £324,452.

**COBALT ORE SHIPMENTS.**

Following are the weekly shipments from the Cobalt camp, and those from Jan. 1, 1909, to date:—

|                            | June 19.<br>Ore in lbs. | Since<br>Jan. 1.<br>Ore in lbs. |
|----------------------------|-------------------------|---------------------------------|
| Buffalo .....              | 46,900                  | 567,624                         |
| Chambers-Ferland .....     |                         | 659,440                         |
| City of Cobalt .....       | 65,000                  | 874,522                         |
| Cobalt Central .....       | 55,000                  | 363,023                         |
| Coniagas .....             | 61,700                  | 807,005                         |
| Crown Reserve .....        | 223,413                 | 2,774,539                       |
| Drummond .....             |                         | 200,000                         |
| Kerr Lake .....            |                         | 929,558                         |
| King Edward .....          |                         | 141,180                         |
| La Rose .....              | 195,691                 | 6,156,417                       |
| McKinley-Darragh .....     | 59,362                  | 884,422                         |
| Nipissing .....            | 397,688                 | 6,042,970                       |
| Nova Scotia .....          |                         | 480,810                         |
| Nancy Helen .....          |                         | 83,400                          |
| Peterson Lake .....        |                         | 200,540                         |
| O'Brien .....              |                         | 909,976                         |
| Right of Way .....         |                         | 1,709,471                       |
| Silver Queen .....         |                         | 255,335                         |
| Temiskaming .....          | 52,800                  | 1,224,860                       |
| Trethewey .....            |                         | 1,037,838                       |
| T. & H. B. .....           | 60,400                  | 855,260                         |
| Muggley Consolidated ..... |                         | 72,900                          |

Ore shipments to June 19, 1909, from Jan. 1, are 27,231,090 pounds, or 13,615 tons. Total shipments for week ending June 19 are 1,217,954 pounds, or 608 tons.

**B. C. ORE SHIPMENTS.**

The following are the ore shipments for the past week ending June 5 and year to date:

| Boundary Shipments.              |        |         |
|----------------------------------|--------|---------|
| Sally .....                      | 23     | 95      |
| Granby .....                     | 19,640 | 406,066 |
| Snowshoe .....                   | 2,290  | 48,527  |
| Other mines .....                |        | 22,814  |
| Total .....                      | 21,953 | 477,502 |
| Rossland Shipments.              |        |         |
| Centre Star .....                | 3,885  | 69,787  |
| Le Roi No. 2 .....               | 574    | 13,446  |
| Le Roi No. 2, concentrated ..... | 43     | 127     |
| Le Roi No. 2, milled .....       | 260    | 10,300  |
| Other mines .....                |        | 9,325   |
| Total .....                      | 4,762  | 102,985 |
| Slocan Kootenay Shipments.       |        |         |
| Richmond Eureka .....            | 40     | 1,683   |
| Van Roi .....                    | 20     | 227     |
| Ferguson .....                   | 31     | 31      |
| Silver King .....                | 104    | 1,800   |
| Blue Bell .....                  | 134    | 2,348   |
| Whitewater Deep .....            | 24     | 1,521   |
| Rambler Cariboo .....            | 41     | 391     |
| Yankee Girl .....                | 41     | 380     |
| North Star .....                 | 91     | 91      |
| Queen, milled .....              | 420    | 9,030   |
| Granite-Poorman, milled .....    | 250    | 5,350   |
| Whitewater Deep, milled .....    | 700    | 15,200  |
| Kootenay Belle, milled .....     | 70     | 1,440   |
| Second Relief, milled .....      | 145    | 3,220   |
| Nugget, milled .....             | 110    | 2,370   |
| Blue Bell, milled .....          | 900    | 19,400  |
| Other mines .....                |        | 14,004  |
| Total .....                      | 3,121  | 78,486  |

The total shipments for the past week were 29,836 tons and for the year to date 658,973 tons.

**Granby Smelter Receipts.**

| Grand Forks, B. C. |        |         |  |
|--------------------|--------|---------|--|
| Granby .....       | 19,640 | 406,066 |  |
| Other mines .....  |        | 270     |  |
| Total .....        | 19,640 | 406,336 |  |

**Consolidated Co.'s Receipts.**

| Trail, B. C.                      |       |         |  |
|-----------------------------------|-------|---------|--|
| Centre Star .....                 | 3,885 | 69,787  |  |
| Snowshoe .....                    | 2,290 | 48,527  |  |
| Le Roi No. 2 .....                | 574   | 13,446  |  |
| Le Roi, No. 2, concentrates ..... | 43    | 127     |  |
| Sally .....                       | 23    | 95      |  |
| Richmond Eureka .....             | 40    | 1,683   |  |
| Van Roi .....                     | 20    | 227     |  |
| Ferguson .....                    | 31    | 31      |  |
| Silver King .....                 | 104   | 1,800   |  |
| Blue Bell .....                   | 134   | 2,348   |  |
| Whitewater Deep .....             | 24    | 1,521   |  |
| Rambler Cariboo .....             | 41    | 391     |  |
| Yankee Girl .....                 | 41    | 380     |  |
| North Star .....                  | 91    | 91      |  |
| Other mines .....                 |       | 7,672   |  |
| Total .....                       | 7,341 | 148,226 |  |

The total smelter receipts for the past week were 26,981 tons and for the year to date 704,345 tons.

The following were the ore shipments for the past week ending June 12th:

**Boundary Shipments.**

|                   |        |         |
|-------------------|--------|---------|
| Granby .....      | 19,970 | 425,036 |
| Snowshoe .....    | 3,137  | 51,664  |
| Other mines ..... |        | 22,915  |
| Total .....       | 23,107 | 499,615 |

**Rossland Shipments.**

|                            |       |         |
|----------------------------|-------|---------|
| Centre Star .....          | 3,272 | 73,059  |
| Le Roi No. 2 .....         | 525   | 13,971  |
| Le Roi No. 2, milled ..... | 260   | 10,560  |
| Other mines .....          |       | 9,452   |
| Total .....                | 4,057 | 188,042 |

**Slocan, Kootenay, Shipments.**

|                               |       |        |
|-------------------------------|-------|--------|
| St. Eugene .....              | 614   | 9,351  |
| Blue Bird .....               | 10    | 10     |
| Hot Punch .....               | 16    | 16     |
| Queen .....                   | 38    | 253    |
| North Star .....              | 30    | 61     |
| Yankee Girl .....             | 23    | 403    |
| Lucky Jim .....               | 150   | 638    |
| Whitewater Deep .....         | 330   | 1,851  |
| Ruth .....                    | 120   | 540    |
| Last Chance .....             | 90    | 90     |
| Queen, milled .....           | 420   | 9,450  |
| Granite-Poorman, milled ..... | 250   | 5,600  |
| Whitewater Deep, milled ..... | 700   | 15,900 |
| Kootenay Belle, milled .....  | 70    | 1,510  |
| Second Relief .....           | 145   | 3,365  |
| Nugget, milled .....          | 110   | 2,480  |
| Blue Bell, milled .....       | 900   | 20,300 |
| Other mines .....             |       | 10,734 |
| Total .....                   | 4,066 | 82,552 |



The total shipments for the past week were 31,230 tons and for the year to date 770,219 tons.

#### Granby Smelter Receipts.

| Grand Forks, B.C. |        |         |
|-------------------|--------|---------|
| Granby .....      | 19,970 | 425,036 |
| Other mines ..... |        | 270     |
| Total .....       | 19,970 | 425,306 |

#### Consolidated Co.'s Receipts.

| Trail, B. C.      |       |         |
|-------------------|-------|---------|
| St. Eugene .....  | 664   | 9,351   |
| Snowshoe .....    | 3,137 | 51,664  |
| Le Roi No. 2..... | 525   | 13,971  |
| Centre Star ..... | 3,272 | 73,059  |
| Blue Bird .....   | 10    | 10      |
| Hot Punch .....   | 16    | 16      |
| Queen .....       | 38    | 253     |
| North Star .....  | 30    | 61      |
| Yankee Girl ..... | 23    | 403     |
| Other mines ..... |       | 7,153   |
| Total .....       | 7,715 | 155,941 |

The total smelter receipts for the past week were 27,685 tons and for the year to date 733,030.

L. Vogelstein & Co., New York, report the following figures of German consumption of foreign copper during the months January-April, 1909:—

|                            |              |
|----------------------------|--------------|
| Imports of copper.....     | 49,323 tons. |
| Exports of copper.....     | 2,703 tons.  |
| Consumption of copper..... | 46,620 tons. |

As compared with consumption during the same period in 1908 of 53,810 tons. Of the above quantity 45,026 tons were imported from the United States.

#### TORONTO MARKETS.

**Metals—June 22**—(Quotations from Canada Metal Co., Toronto.—These prices are slightly higher than wholesale prices obtainable on large orders.)

|                                    |
|------------------------------------|
| Spelter, 5½ to 5¾ cents per pound. |
| Lead, 3½ cents per lb.             |
| Antimony, 8½ cents per lb.         |
| Tin, 31 cents per lb.              |

#### Copper—

|                                 |
|---------------------------------|
| Casting, 13¾ cents per lb.      |
| Electrolytic, 13¾ cents per lb. |
| Lake, 14 cents per lb.          |

**Ingot Brass**, 10 to 14 cents per lb.

#### Coal—

|                                                 |
|-------------------------------------------------|
| Anthracite, \$5.50 to \$6.75.                   |
| Bituminous, \$3.50 to \$4.50 for 1¼ inch. lump. |

**Pig Iron—June 22**—(Quotations from Drummond, McCall & Co.)

|                                                      |
|------------------------------------------------------|
| Summerlee, No. 1, \$21.75 (f.o.b. Toronto).          |
| Summerlee, No. 2, \$21.25 (f.o.b. Toronto).          |
| Midland, No. 1, \$17.75 to \$18.00 (f.o.b. Midland). |

#### MARKET REPORTS.

##### Coke.

**June 18.**—Connellsville Coke, f.o.b. ovens:—

|                                                 |
|-------------------------------------------------|
| Furnace coke, prompt, \$1.50 to \$1.60 per ton. |
| Foundry coke, prompt, \$1.80 to \$1.90 per ton. |

##### Metals.

**June 18.**—Tin, straits, 29.50 cents.

|                                                   |
|---------------------------------------------------|
| Copper, prime lake, 13.50 cents.                  |
| Electrolytic copper, 13.125 cents.                |
| Copper wire, 15 cents.                            |
| Lead, 4.35 to 4.40 cents.                         |
| Spelter, 5.45 cents.                              |
| Sheet zinc, 7.50 cents.                           |
| Antimony, Cookson's, 8.25 cents.                  |
| Aluminium, 21 to 24 cents.                        |
| Nickel, 40 to 47 cents.                           |
| Platinum, \$22.50 to \$23.50 per oz.              |
| Bismuth, \$1.75 per lb.                           |
| Quicksilver, \$44.50 to \$45.00 per 75-lb. flask. |

#### SILVER PRICES

|             | New York.<br>Cents. | London.<br>Pence. |
|-------------|---------------------|-------------------|
| June 5..... | 53¼                 | 24½               |
| " 7.....    | 53                  | 24¾               |
| " 8.....    | 52¾                 | 24¼               |
| " 9.....    | 52⅞                 | 24 5-16           |
| " 10.....   | 52⅞                 | 24 3-16           |
| " 11.....   | 52⅞                 | 24¾               |
| " 13.....   | 52⅞                 | 24 3-16           |
| " 14.....   | 52⅞                 | 24 1-16           |
| " 15.....   | 52¼                 | 24                |
| " 16.....   | 52⅞                 | 24½               |
| " 17.....   | 52⅞                 | 24½               |
| " 18.....   | 52¼                 | 24                |

#### MARKET NOTES.

**Silver.**—During the first week of June, India was a buyer of cash silver, but a seller of forward. Business was large. The Punjab crop forecasts are distinctly favorable. Wheat will, it is estimated, exceed the average output by 22 1-2 per cent. Other crops show up even better. Thus prospects are good for a strong silver market throughout the year.

The Commission appointed by Governor Hughes to investigate the methods of various exchanges, reported thus upon the Metal Exchange:—"Similar, but equally deceptive, is the method of making quotations on the Metal Exchange. In spite of the apparent activity of dealings in this organization in published market reports, there are no actual sales on the floor of the Metal Exchange, and we are assured that there have been none for several years. Prices are, however, manipulated up and down by a quotation committee of three, chosen annually, who represent the great metal selling agencies as their interest may appear, affording facilities for fixing prices on large contracts, mainly for the profit of a small clique, embracing, however, some of the largest interests in the metal trade.

"These practises result in deceiving buyers and sellers. The making and publishing of quotations for commodities or securities by groups of men calling themselves an exchange, or by any other similar title, whether incorporated or not, should be prohibited by law, where such quotations do not fairly and truthfully represent any bona fide transactions on such exchanges. Under present con-

ditions, we are of the opinion that the mercantile and metal exchanges do actual harm to producers and consumers, and that their charters should be repealed."

Remarkable pegging activity is reported from the West Rand. 8000 claims have been pegged since September.

Up to June 1 three drills had withdrawn from the public competition now in progress.

The Rooiberg tin mines started milling on May 31.

Of the 7,734 Chinese in the Transvaal on April 30, seven died during May and ten were removed, leaving 7,717 in the country on May 31st.

The Transvaal Government has appointed a Commission to inquire into and report upon the question as to whether any portion of the moneys accruing to the Crown from the leasing and disposal of rights of mining in Crown lands, etc., should be paid to any class of persons, and if so, to what class or classes, and in what proportion.

### COMPANY NOTES

Directors of La Rose Consolidated Mines declare the quarterly dividend of three per cent., along with a bonus of one per cent.

Total production, June 1st, 1908, to May 31st, 1909, one year:

| Shipments.                                        | Tons.    | Ounces<br>Silver. | Net Value<br>at Mine. |
|---------------------------------------------------|----------|-------------------|-----------------------|
| June-December, 1908 ...                           | 325,777  | 1,498,592         | \$671,286             |
| January, 1909 .....                               | 58,145   | 291,349           | 132,597               |
| February, 1909 .....                              | 50,280   | 220,938           | 99,237                |
| March, 1909 .....                                 | 49,281   | 131,345           | 55,187                |
| April, 1909 .....                                 | 64,984   | 309,944           | 137,128               |
| May, 1909 .....                                   | 56,956   | 496,004           | 226,043               |
| Total shipments .....                             | 6,054.25 | 2,921,174         | \$1,321,480           |
| On hand May 31, 1909...                           | 1,109.19 | 89,656            | 42,891                |
| Total production .....                            | 6,164.44 | 3,010,831         | \$1,364,372           |
| Sundry income (interest and ground rentals) ..... |          |                   | 1,518                 |
|                                                   |          |                   | \$1,575,497           |
| Marketing expenses .....                          |          | \$203,231.19      |                       |
| Concentrating .....                               |          | 6,375.20          |                       |
| Operating expenses at mine .....                  |          | 272,318.67        |                       |
|                                                   |          |                   | \$481,925             |
| Net operating profit for one year .....           |          |                   | \$1,093,572           |
| Construction accounts .....                       |          |                   | 23,574                |

A number of cities and towns in the United States may obtain their light, heat and power direct from peat bogs in the near future. The statement is made by Federal experts that millions of dollars worth of fuel lies undeveloped in the swamps and bogs of the country, awaiting only the genius and business ability of the American before it drives the wheels of progress. Its value, on a basis of \$3.00 a ton, roughly guessed at by experts of the Geological Survey, who have been studying the peat deposits for some time, is more than thirty-eight billion dollars—more money than is represented in all the property, stock, implements and buildings owned by the farmers of the United States.

With the coal supply being used at a tremendous rate, peat is expected to become a most important auxiliary fuel and one that will prolong the life of the coal itself. An important fact which leads the experts to believe that peat will soon come into

quite general use in certain parts of the country is that it is as a rule found in quantities in regions far removed from the coal fields, so far that the cost of transporting the coal amount to several times the cost of the fuel itself at the mines.

The states containing the greatest amount of peat are the eastern Dakotas, Minnesota, Wisconsin, Michigan, Northern Iowa, Illinois, Indiana, Ohio, New York, the New England States, New Jersey, portions of Virginia, North and South Carolina, Georgia and Florida.

A thorough investigation of the peat resources is now being undertaken by the Geological Survey, not only as to the amount of peat and its location, but also its use. Prof. Charles A. Davis, of the Technologic Branch, has general charge of the investigations, while Prof. Robert H. Fernald, consulting engineer in charge of gas producer tests, is endeavoring to find the value of peat as a fuel for heating and power purposes. The latter but recently returned from a trip to Europe where he investigated the uses of peat and found the older countries much farther advanced along this line than the United States. Professor Fernald returns with the belief that peat will soon be extensively used in the United States. In Ireland, he found that peat was being used generally for domestic purposes but not by the manufacturing establishments. "Sweden is dotted with peat deposits and its bogs are now being extensively utilized for power purposes," says Prof. Fernald. "During the last eight years new bogs have been constantly added to the list until bogs producing from 2,000 to 5,000 tons of dry peat for power purposes per year are found on every hand. The consulting engineers who have installed some of these plants are unquestionably working in the right direction, placing the power plant directly in the peat bog and transmitting the electric current to the surrounding towns. The current is being used for manufacturing purposes and also for lighting both the streets and houses. The installation of the power plant in the bog or at the mine has been advocated in this country by the Technologic Branch of the Survey for installation of several thousand horsepower only, yet this principle is applied in Sweden to small plants and may be feasible in certain parts of this country."

"Another development in the line of peat industry which promises splendid returns is the use of peat in by-product recovery gas plants. From these plants both gas for power and sulphate of ammonia can be obtained in commercially paying quantities. Both the utilization of peat for producer gas and for producer gas and for the recovery of sulphate of ammonia are perfectly feasible with American peats. Although the work done on peat at the Survey experiment plant has been limited, it has been demonstrated that gas for power can be made easily from both Florida and Massachusetts peat."

Professor Davis, who has just issued jointly with Edson A. Bastin, a bulletin on peat is optimistic on the future of peat, yet he believes the development of the industry should be accompanied by great caution.

"The operation of a gas engine at the experiment plant on peat in one or two tests has shown that this fuel is but little inferior to many grades of soft coal now on the market and superior to some in the quantity of power gas produced," says Professor Davis. "I believe the day is coming soon when cities located near the peat bogs and away from the coal fields will obtain their power and light from peat. I understand that Florida is to have a power plant soon that will use peat as fuel and will transmit the electricity to Jacksonville."

In the development of this industry, however, it must be remembered that peat contains from 85 to 90 per cent. water as it comes from the bogs. All but 15 to 20 per cent. can be dried out by exposure of the peat to the air. In burning peat in gas producers to make power gas, this peat will burn successfully with 40 per cent. moisture, which is impossible in a furnace."



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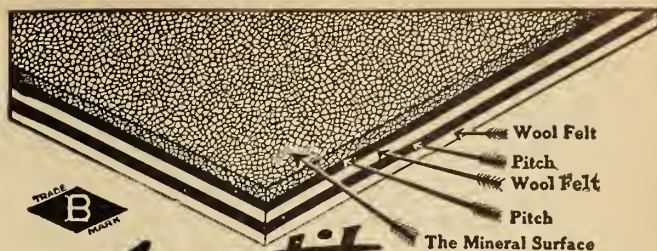
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# Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals and extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The allied metal, cobalt, is also found in Ontario in unsurpassed quantities.

The output of iron, copper, nickel, silver and cobalt in 1906 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

**HON. FRANK COCHRANE,**

Minister of Lands, Forests and Mines,  
**Toronto, Canada.**

# PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Government of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unsurveyed territory, is open to prospecting.

**Miners' Certificates** good for a calendar year may be obtained by sending \$10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minimum being 40 acres in unsurveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of \$10.00 plus a yearly rental of \$1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed

territory may be purchased as a mining concession at the price of \$20.00 per acre if within 20 miles of a railway in a straight line, or \$10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

**The Hon. Minister of Colonization, Mines and Fisheries  
Quebec.**

## Province of Nova Scotia

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Copies of the Mining Law and any information can be had on application to

**The Hon. Christopher Chisholm**

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

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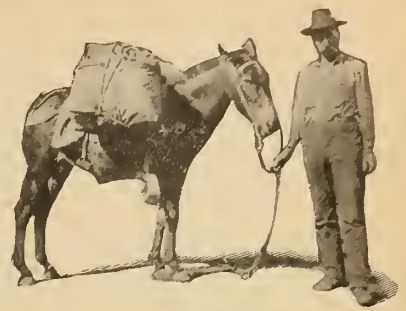
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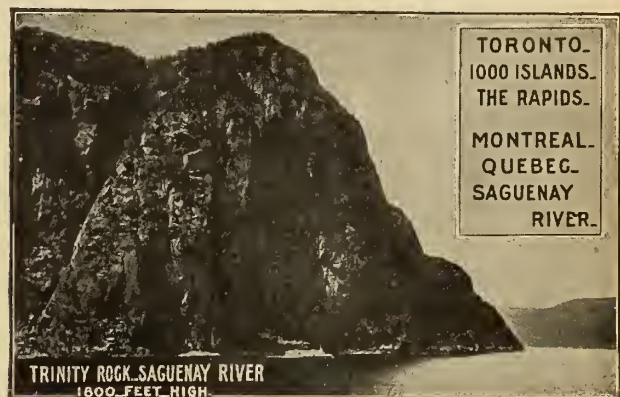
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## BRITISH COLUMBIA

## The Mineral Province of Canada

has produced to the end of 1906, \$68,721,103 of Placer Gold; \$41,015,697 of Lode Gold, \$25,586,008 of Silver \$17,625,739 of Lead; \$35,546,578 of Copper; \$79,334,798 of Coal and Coke; and \$5,813,799 of Other Minerals or a total of **\$273,643,722**. The Mineral Production of the Province for 1906 was

**\$24,980,546**

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was \$5,579,03 the Lead Output 52,408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

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Mineral Locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

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**HON. MINISTER OF MINES**

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**QUARTZ**—A person 18 years of age, or over, having discovered mineral in place may locate a claim 1,500 x 1,500 feet.

The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year, or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey made, and upon complying with other requirements, purchase the land at \$1 per acre.

The patent provides for the payment of a royalty of 2½ per cent. on the sales.

Placer mining claims generally are 100 feet square; entry fee \$5, renewable yearly.

An applicant may obtain two leases to dredge for gold of five miles each for a term of twenty years, renewable at the discretion of the Minister of the Interior.

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles. Rental \$10 per annum for each mile of river leased. Royalty at the rate of 2½ per cent. collected on the output after it exceeds \$10,000.

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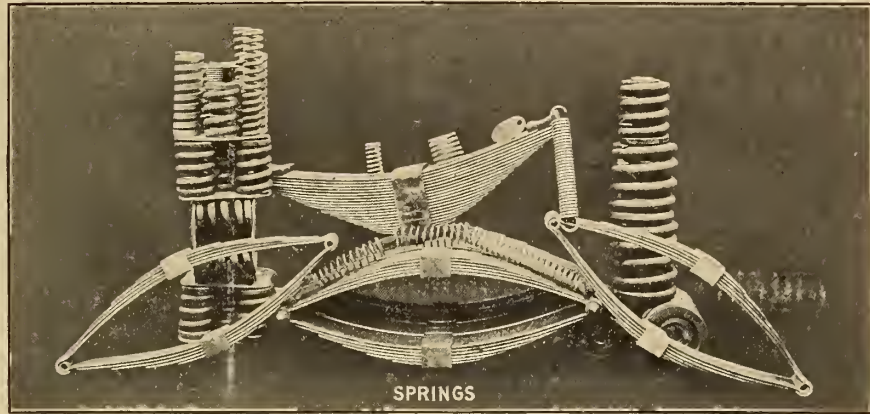
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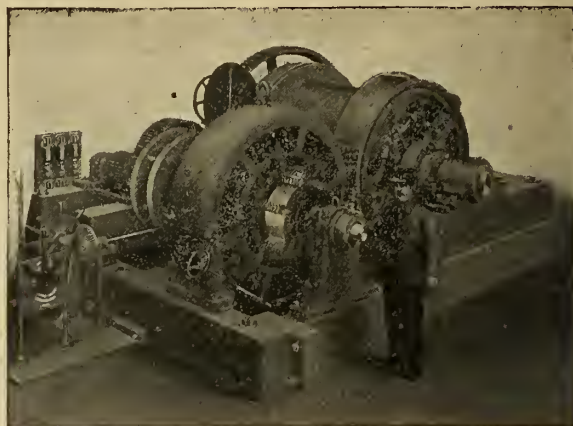
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Whether intended for alternating or direct current service, and no matter what the conditions to be met, we have just the right motor and just the right controller to operate it. Don't bother about your hoisting problems, let our engineers solve them for you.



500 H. P. Westinghouse Motor with automatic control driving a Mine Hoist installed 800 feet below the surface.

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MANUFACTURERS OF

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### NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

### "WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. It does not freeze, or rather, explodes with perfect efficiency when frozen and needs no thawing.

### "AUTUMN BRAND" DYNAMITE

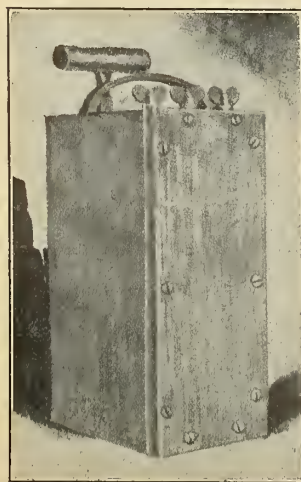
Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

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Three Post Magneto Electric Blasting Machine

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Holes at Floor Level or Roof Level or in any intermediate position in Coal or Dirt Band, &c.

Equally suitable for Holing and Shearing.

The Lightest Coal Cutter in the Market.

Nearly 700 Machines at work. 93 in use by one Canadian Company.

## The Hardy Simplex Hammer Drill

Weight 22 lbs. Bores 6 ft. Deep.

Automatically Rotates the Drill Steel and lows out the Cuttings  
FOR SINKING, &c.

**SOLE MAKERS**

**The Hardy Patent Pick Co., Limited**  
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Stocks of these machines kept by Messrs. A. C. Thompson  
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In order that you may judge by actual results obtained by severe tests, in your own stopes and raises, the remarkable cutting capacity, efficiency, simplicity, low operating cost, convenience in handling and durability of

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We will send you a complete equipment for 30 days trial with the understanding that it can be returned if not found entirely satisfactory in every way.

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Are you stoping or raising? If you are, it will pay you to drop us a line whether you are in the market just now or not.

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Cobalt, Ontario.

ROCK DRILLS, PNEUMATIC TOOLS, HOSE, DRILL STEEL, ETC.





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### Electric Locomotives

Comparative cost of maintenance of Jeffrey locomotives with other locomotives has been made by a number of the largest users of electric locomotives in the United States resulting in the establishment of Jeffrey locomotives as standard equipment. Write for Bulletin X15.

**Complete Coal Mine Equipments.**

### We Build

## Complete Coal Mine and Tipple Equipments

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## Sullivan Hammer Drills



Sullivan D-21 Drills in The La Rose Mine, Cobalt, Ont.

In narrow stopes at Cobalt, Sullivan D-21 Air feed Hammer Drills are reducing ground-breaking cost from 35 to 50 per cent., as compared with piston drills on columns or bars.

These Drills are handled by one man, and may be operated in any stope or raise which a man can enter.

Send for "Mine & Quarry" for June, which contains "Notes on Mining at Cobalt."

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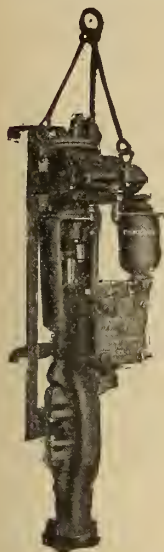
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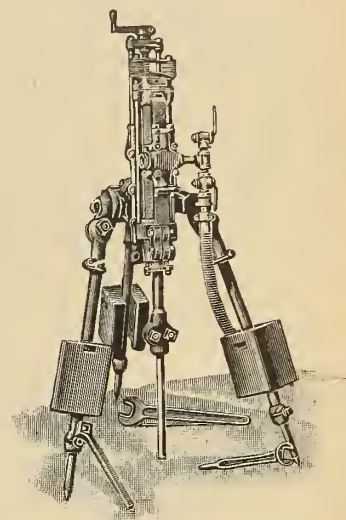


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Carried in Stock at Toronto  
Both New and Second Hand  
all ready to ship

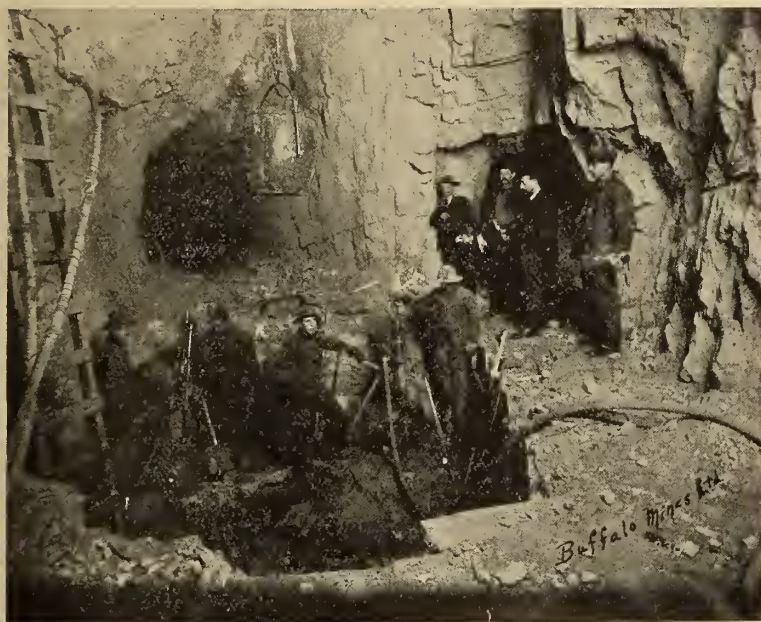
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Head Office; TORONTO, Branches: MONTREAL WINNIPEG VANCOUVER.

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"Little Giant"

## Rock Drills

☛ Built in sizes ranging from 2" to 5½" Cylinder diameter, for all work from boulder breaking to submarine drilling.

☛ Our claim that the Rand drill is the best in the market is proven by the sale of more of this type than of all other makes combined.

☛ Prices and catalog on request, or ask to have one of our representatives call.

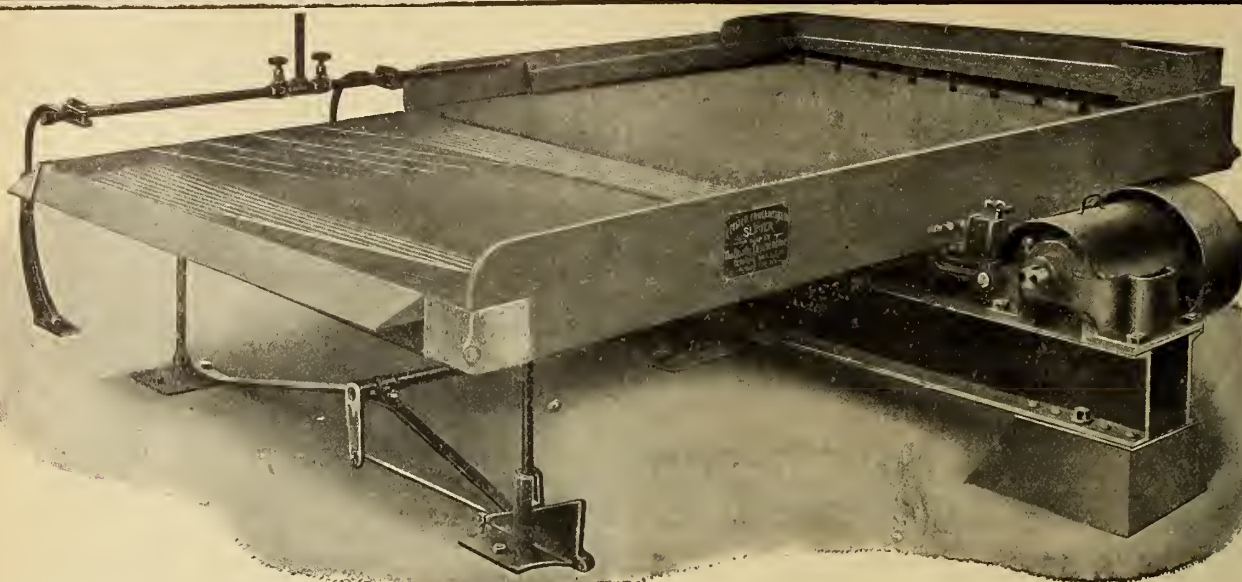
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Montreal, Canada

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### What a User says of the Deister:

I have yours of the 7th inst. and am pleased to advise you that the results obtained at our Calvario mill with the Deister No. 3 Concentrating tables under my personal observation in treating the ores from the Carboncillo mine were not only satisfactory but have made it possible for us to treat one of our low grade ores at a good profit which heretofore could not be treated except at a loss. Ours is a gold-silver ore which was given to your table through an 80-mesh screen at the rate of about 12 tons per 24 hours. The table requires but very little attention and from our experience I am convinced that there is no machine now in use which could give us the results obtained. Neg. Minera "El Carboncillo y Anexas, S. A.," Zacualpam, Mexico. Yours truly, (Signed) A. C. Chabaud, Mgr.

**EMIL DEISTER,**

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HEAD OFFICE - - - - - TORONTO  
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President

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General Manager

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Branches at **Cobalt, Elk Lake, Cowganda, and Latchford** in the silver mining camp of New Ontario and throughout Canada; also in the United States and England.

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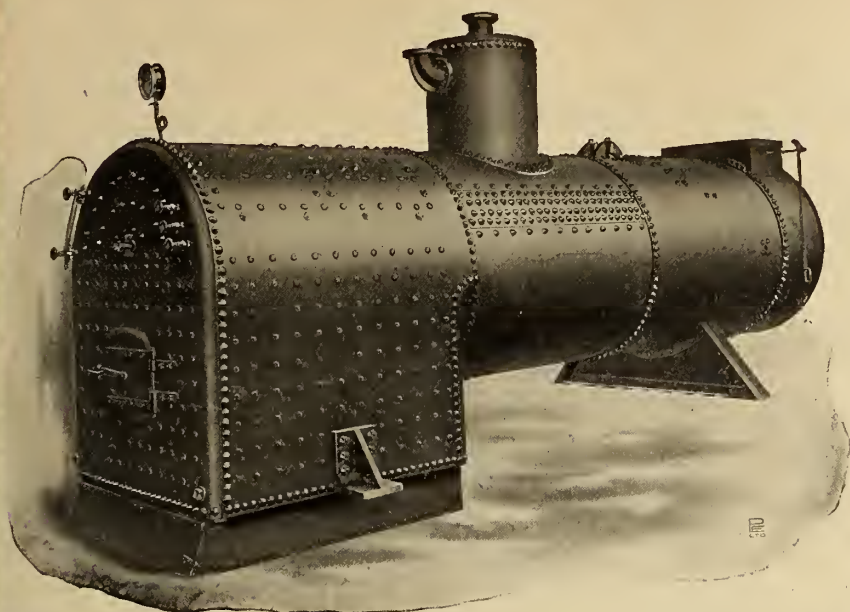
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and reported upon.

Write for prices for  
Ore analysis.

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CLYDE PATENT WIRE ROPE WORKS

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For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. **SPECIALLY FLEXIBLE ROPES** for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. **SPECIAL ROPE FOR LOGGING.**

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Montreal and Toronto : Drummond, McCall & Co. Vancouver, B.C. : John Burns. Winnipeg : David Philip, Portage Ave.

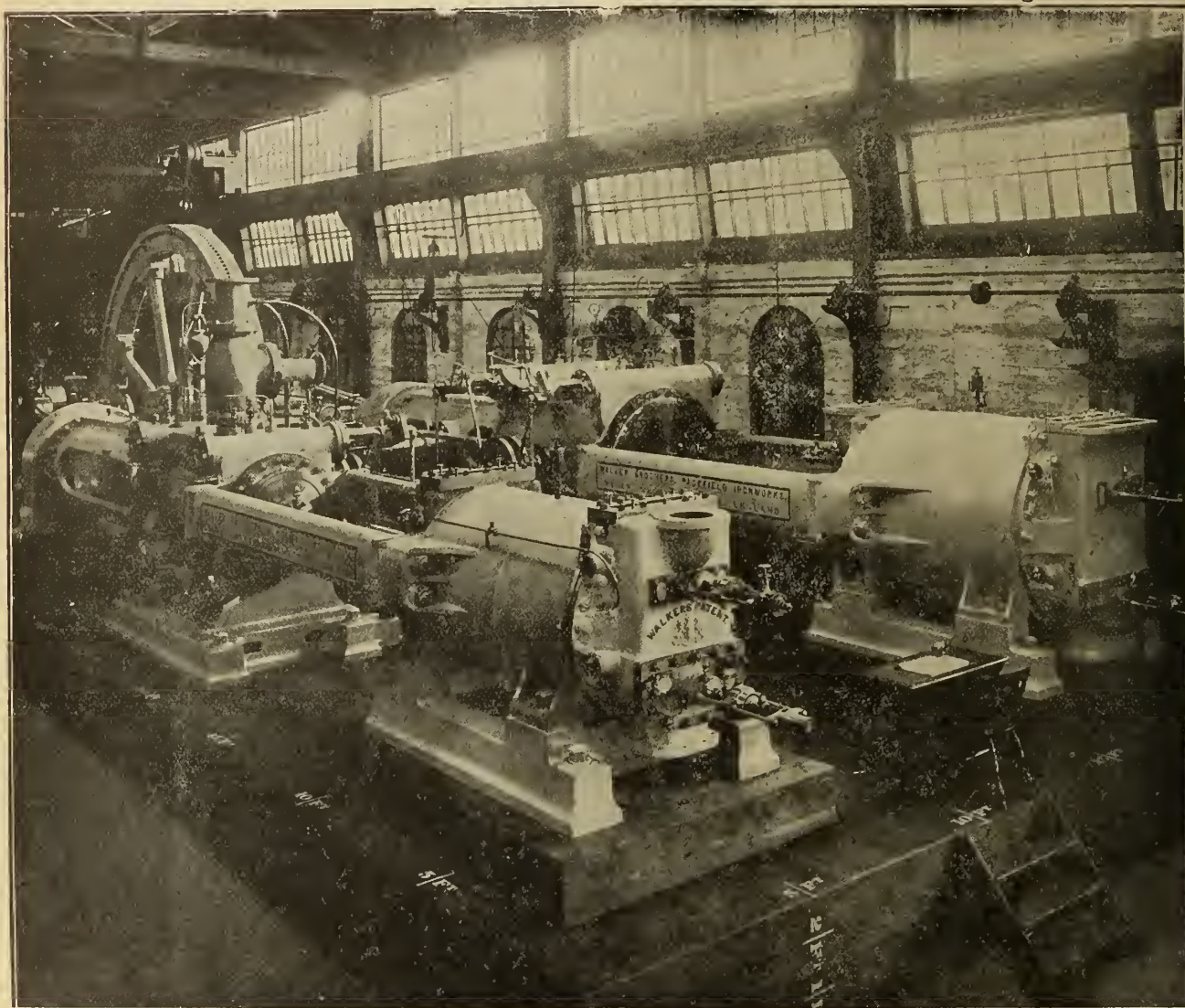
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CANADA LIFE BUILDING,  
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**CRUSHING AND GRINDING MACHINERY**  
of every description.

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is used for all the wearing parts. This steel is the supreme material for  
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## Steel Castings for Collieries, Mines, etc.,

Including  
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ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

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Heclon Rock and Ore Breaker. Hadfield & Jack's Patent.

## FOR DYNAMITE, ROCK-CHIEF AND ALL KINDS OF BLASTING SUPPLIES

QUALITY UNSURPASSED  
ALL PRODUCTS GUARANTEED  
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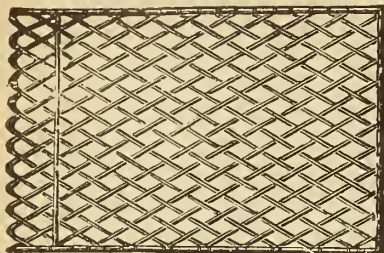
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Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

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**Engines, Air Compressors**

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We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., \$400 to \$10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

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TORONTO, ONT.

MINING COMPANY AUDITS A SPECIALTY

## MILLING AND MINING MACHINERY

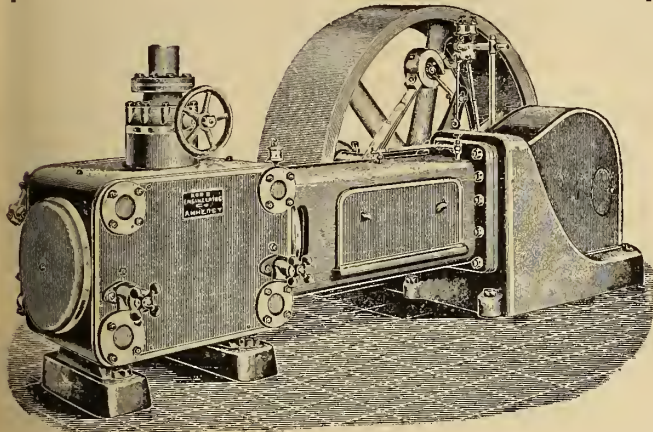
Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

**Alex. Fleck Ltd. - Ottawa**

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### Engines

Corliss  
Slide Valve,  
Horizontal,  
Vertical,

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Internally Fired,  
Portable,

**Robb Engineering Co., Ltd., Amherst, N.S.**

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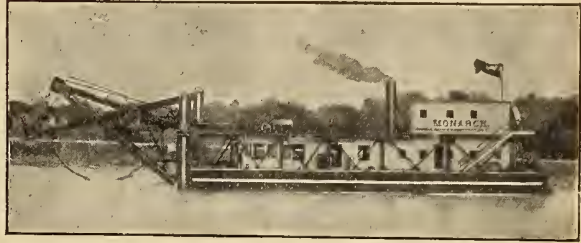
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**Submarine Rock Drilling Machinery,**

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and other Contractors' Machinery.

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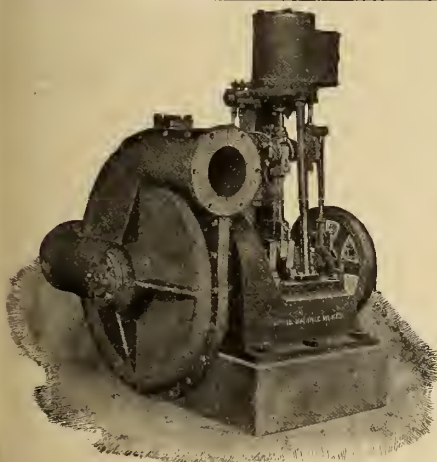
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BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK



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Centrifugal Pumping Machinery for various Industrial Purposes

We are building a special solid steel lined pump for handling tailings or slimes in gold mining. Estimates furnished upon application for pumping outfits for special purposes. Write for catalogue.

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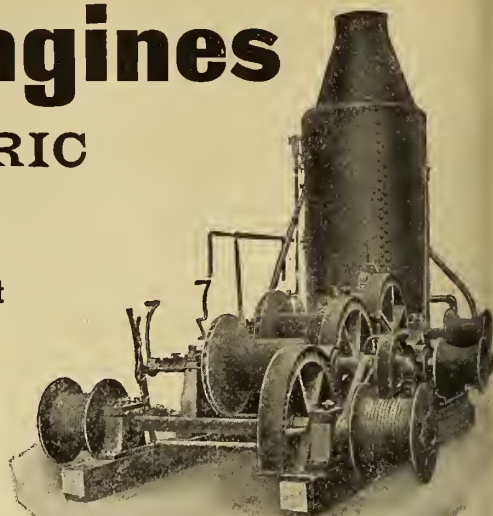
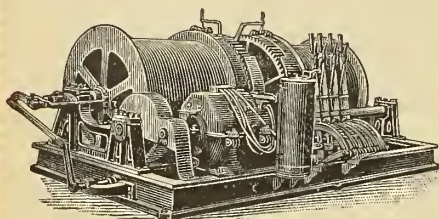
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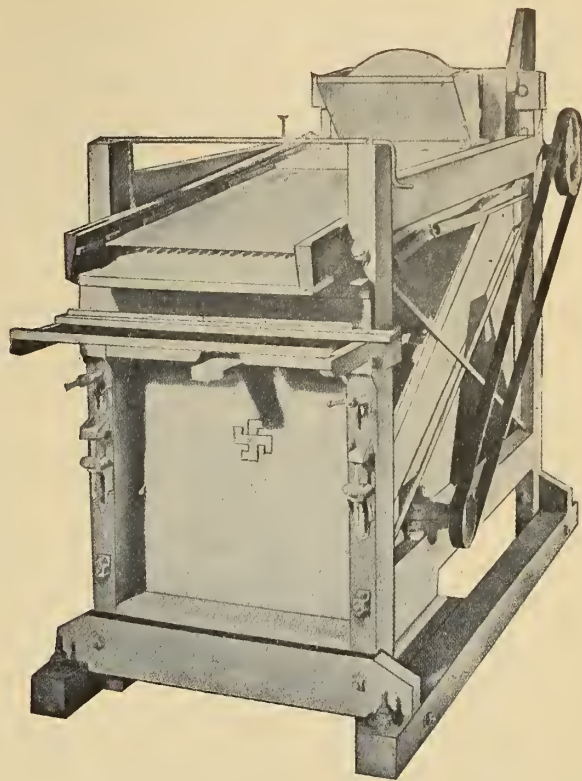
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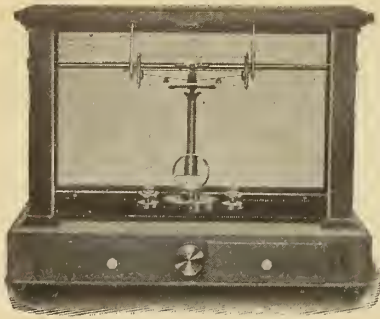
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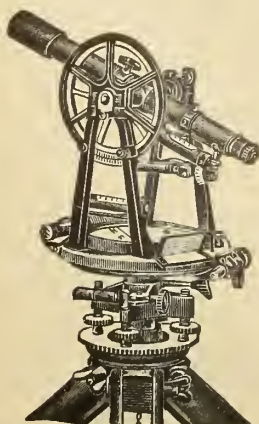
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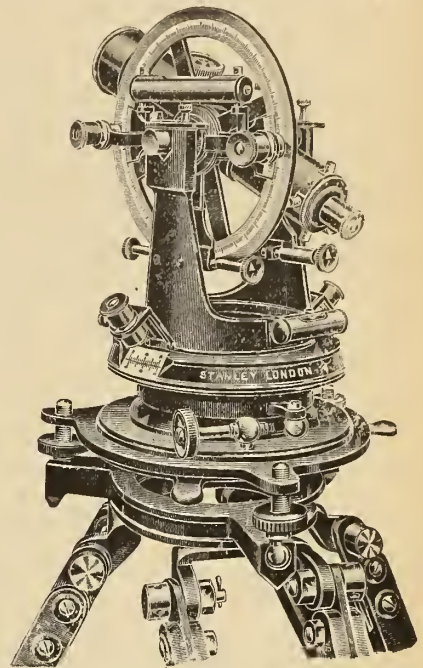
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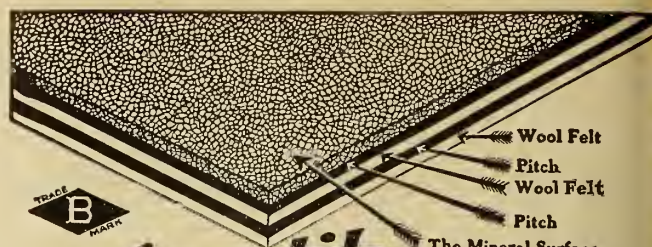
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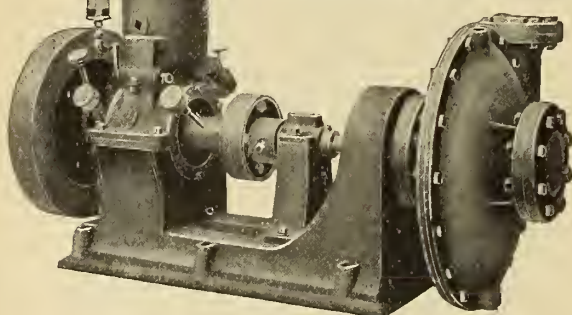
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, July 15, 1909

No. 14

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

MINES PUBLISHING CO., LIMITED

Head Office . . . Confederation Life Building, Toronto.  
Branch Offices Montreal, Halifax, Victoria, and London, Eng.

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J. C. MURRAY, B.A., B.Sc.

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### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

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### THE STRIKE AT GLACE BAY.

That a foreign labour organization should be permitted to proselytize Canadian workmen by means of specious promises and baseless agitation is creditable neither to the good sense of the workmen themselves nor to the Canadian nation generally. But when foreign demagogues, in their desire to crush a Canadian labour party, incite some thousands of Canadian workmen to strike, then conditions have indeed become intolerable.

The Canadian Mining Journal has placed itself on record before now as being radically opposed to the encroachments of United States labour federations. The history of these bodies shows nothing that recommends either their aims or their methods. Their aims are inordinately selfish; their methods obnoxious to right-minded men. There is need for neither in this country.

From all that we can learn before going to press, it is probable that the United Mine Workers will be defeated in their attempts to cripple the Dominion Coal Company and to destroy the Provincial Workmen's Association. Their defeat will be due to the sane conduct of the P. W. A. members who refused to strike without honest cause. While we believe that this will quicken the P. W. A. into stronger life, it must be understood that the U. M. W. is a relentless and persistent enemy. Its resources are large, far larger than are those of the P. W. A. It never scruples to engender strife between capital and labour, and its policy is to precipitate strikes whenever possible. Its present action entails loss upon Canada as a whole, upon the Dominion Coal Company, and, most grievous of all, upon many hundreds of misguided workmen.

It is high time that Canadians recognized the absolute necessity of controlling their own affairs. The Lemieux Conciliation Act, an admirably designed piece of legislation, is intended to do away with the barbarous strike. It is a Canadian Act, drawn up for the benefit of Canada. If agitators from the United States, or from any other country, are allowed to foment trouble, the Conciliation Act becomes a superfluity. We heartily approve of the refusal of the Dominion Coal Company to treat with the U. M. W. In this it has established a precedent that will, we sincerely hope, be followed by all Canadian companies. But we would go further than this. To give to foreigners the right to invoke the interposition of a Conciliation Board is to invite constant trouble. This privilege must be confined to Canadian citizens. For their protection the Act was formulated.

Canada looks after the interests of the foreigner within her gates as well as, if not better than, most

other countries. But her duty is first to protect her own citizens. Canadian labour can best be protected by measures that will eradicate the imported agitator who makes the Conciliation Act a stumbling-block and arbitration a vain thing.

Our newly appointed Minister of Labour could signalize his advent to office most fittingly by restricting the application of the Act to Canadians.

The Dominion Coal Company never had a strike, never erected fences for protection, never called in the police until the U. M. W. made it appearance in Nova Scotia.

### ASBESTOS ONCE AGAIN.

Quebec asbestos mining is suffering more than its fair share of promotion. On the heels of the huge Amalgamated flotation comes news of a new "merger"—the Black Lake Consolidated Asbestos Company, capitalized at \$5,000,000. The holdings of the latter concern cover some 5,000 acres of territory, only a small fraction of which is developed. Not one of the properties has been worked at a profit. Further, development so far has given little indication that the properties are valuable.

We believe that shares in neither Amalgamated nor Consolidated will find a ready market in this country. If they are placed successfully in London it will be due to the ignorance of trans-Atlantic investors as to the condition of affairs in Quebec.

The asbestos industry of Quebec is, per se, a vigorous, sound, and progressive branch of mining. Until recently, Canadian producers have been able practically to control the market. As mentioned before, however, Russia is becoming a formidable competitor. South Africa will sooner or later enter the field with a high-grade article. Other countries will also take their quota of the trade.

Quebec producers will continue pre-eminent for some time. They have reached a stage of development and equipment that new districts cannot approach for several years. We hope that Quebec will always maintain a leading position. But it is futile to ignore the developments that are taking place in other lands; and it is criminal for promoters to discount the future with no regard to the inevitable competition of foreign producers.

It is justifiable, then, to look upon the present asbestos flotations as untimely, unprofitable, and inflated to a degree that will do positive and immediate injury to the industry. Consolidation is often wise. Often it is necessary to the reduction of working and administrative costs. We do not believe that working costs in the Quebec asbestos mines will be lowered one cent under the control of the new corporation. We know that fixed charges will be very considerably increased. The new organizations have been called into being not to cheapen production, but to line the pockets

of promoters. Not consolidation, but inflation, is the keynote of the Amalgamated Asbestos Corporation and of the Black Lake Consolidated.

It is pertinent to add here that within the past quarter there has been a notable reduction in the selling price of all grades of asbestos. Overproduction, a deliberate preliminary to promotion, has surfeited the market. Information has reached us from producers and from consumers signifying that the drop has been heavy, in some instances amounting to more than 25 per cent., a reduction that will wipe out all profits. Production is being increased, despite this falling market. The object of this is clear. It is literally manipulation to aid in the disposal of Amalgamated shares, by giving a false colour of activity.

### SCOTCH OIL-SHALE COMPANIES.

The present condition and future prospects of mining companies operating the oil-shale deposits of Scotland are noteworthy. Of late the large possibilities of the New Brunswick oil-shales have received wide advertisement. It is probable, indeed, that, ere long, capital will be supplied for the purpose of mining these shales and marketing their diversified products. The Scotch oil-shale industry, as it stands to-day, is a monument of persistent, intelligent, and successful endeavour. Its history will afford guidance and encouragement to those who undertake the exploitation of the New Brunswick deposits.

The past financial year was one of general prosperity for the five companies engaged in the Scotch mineral oil trade. The lower prices obtained for their products were offset by lessened cost of production, due largely to cheaper coal and lower wages. Thus, in spite of keener competition on the part of the Standard Oil Company, aggregate profits amounted to £380,207, as against £372,343 for the preceding year. In addition to profits earned, the plants of the various companies have been enlarged and improved.

The strong financial position of the leading concern, the Pumpherston Company, is noteworthy. Although there was a slight falling off in its profits last year, yet it has been able to maintain its dividend of 50 per cent., to carry forward a larger balance, and to write off the sum of £41,758, the amount expended in improvements. This company has built up a reserve fund of £100,000, and a fire insurance fund of £10,000.

The other companies report increased profits and growing reserves. In every case ample amounts have been allotted to cover depreciation and to build up reserves.

Heretofore, the oil companies have relied upon wholesale dealers to market the oil. One company, the Oakbank, is now attempting to undertake its own marketing. The experiment, if successful, will lead to the organization of a central selling agency that will market the products of all the companies.



The immediate future is clouded by the renewed hostility of the Standard Oil Company, a recent reduction of ½d. per pound in the price of paraffin wax, a drop that will have to be met by the Scotch producers. As paraffin wax is their principal source of profits, the reduction is most unwelcome. On the whole, however, the Scotch companies appear to be entirely able to meet competition. On the other hand, there is little reason to believe that the present rate of dividends can be maintained for an indefinite period.

### A MIGRATING FAKIR.

Last year we were constantly being regaled with blood-curdling stories about what a certain Mr. J. H. Brown, expert, was to do at the Trout Lake Smelter. Between promise and performance there is a vast gulf fixed in Mr. Brown's case. Having exhausted the patience of his shareholders and the resources of his own vocabulary, Mr. Brown looked round for pastures fresh. North Sydney, Nova Scotia, an inoffensive town that has much quiet ambition, appealed to Mr. Brown. Its emerald hue was soothing to his eye. So Brown polished up his intimate "John Hayes Hammond" anecdotes, and blew into North Sydney.

The man who designedly imposes upon a trusting town council is a heartless wretch. Mr. Brown did impose upon North Sydney. The councillors opened their arms and Mr. Brown did the rest. Strange to relate, he got no cash out of his victims—merely concessions of land and certain immunities. But the way in which he mesmerized the local papers was sinful—only less sinful than the stories that he told of his dear friends, Cecil Rhodes and "John" Hammond.

Perhaps Mr. Brown will have vamoosed before this reaches his unregenerate eye. There is in every Nova Scotian community a leavening sense of humour that would prove Brown's undoing. Only it is not easily aroused. But it will be safer for Mr. Brown to purchase a ticket—single fare—for some Pacific port at a very early date.

Fie, fie, Mr. Brown! robbing North Sydney is worse than striking a woman!

### INVESTMENT.

The ideal conditions for mining investment are not those that obtain most largely in Canada. Canadians are yet too anxious to make "turnovers" and "rake-offs" and "commissions." Cobalt is answerable for a good deal of this.

Obvious facts are consistently overlooked. Before a mining prospect can be priced, its future earning capacity as a mine must be indicated. Mining costs are of prime importance; but the net profit on each ton of ore is the vital consideration. Every cent spent in prospecting, in developing, in advertising, in commissions, must ultimately come out of the mine.

Hence the prospecting and development stage is precisely the stage at which expenditure must be most carefully controlled. Otherwise a cumulation millstone is placed on the neck of the venture.

Mining investment is not the purchase of undeveloped property. That is mining venture. The outlay of money to develop known ore bodies, to provide equipment for a mine, and to establish market connections, is investment.

With proper precautions there is no cleaner, more attractive, and more remunerative form of investment, and legitimate opportunities exist all over Canada.

There are many objections to syndicated or incorporated enterprises. Owing to prevalent misconceptions, the average director or syndicate member may always be counted upon to kick at the critical moment when more money is needed to make his mine productive. Only experience will remedy this.

The ideal condition is provided when one or two keen business men employ a competent engineer to develop for them a mineral deposit at a minimum of cost, and when development has proved successful come forward with ample working capital. In a case of this kind no undue risk need be taken, operations may be dropped at any time without serious loss, and the enterprise is pushed only if success is practically assured.

### ROYAL RECOGNITION.

A significant incident is mentioned in a late cable from England. On the occasion of laying the foundation stone of the new buildings of the Imperial College of Science and Technology at South Kensington, King Edward emphasized the supreme importance of technical education. The King referred especially to the function of specialized scientific instruction in fitting England to cope with her industrial competitors, and signified his belief that herein lay her best safeguard in the future.

This is perhaps the most pregnant feature of the wave of industrial change and reform that has been sweeping over Great Britain. Better than warships, more effective than all the artillery in the world, is the protecting power of industrial supremacy. Germany is industrially efficient—more efficient than most people know, less efficient than her panegyrists would have us believe. Commercially, the United States is enormously rich, enterprising, active, and wasteful. Nature has endowed her with marvellous resources. These resources have been exploited recklessly.

Great Britain, as the keystone of the British Federation, must become the developing agent for the outlying members of the Empire. Great Britain has the money, the Empire has the men. Direction and co-operation are needed.

Technically trained men, more especially trained mining engineers, are the missionaries of industrial development. Their work calls them all over the world.

The results of their work will always be the principal factor in fusing and uniting the British Empire.

England is equipping herself to train her youth. The enthusiasm manifested by King Edward is symbolic of the ardent ambition that is permeating the nation and the Empire. We must make ourselves fit if we are to survive in the race.

### THE NEW TIPPLE AT MICHEL.

The new tippie erected for the Crow's Nest Pass Coal Company at Michel, B.C., is worthy of comment. It was working within six months from the date on which the contract was signed. It is now, eleven months from that date, completed.

Although the plant was assembled and erected 3,000 miles from the place of manufacture, and the construction done during the winter season, no delay occurred. As the tippie has a capacity of 1,000 tons of run-of-mine coal per hour, the largest capacity of any single tippie on the continent, its rapid completion is somewhat of an engineering feat.

The tippie structure is of steel throughout. Approximately 600 feet long, it crosses the C. P. R. right of way by a clear span of 105 feet. The equipment includes a self-dumping car haulage system. The tracks are superposed, the haul utilizing the upper and lower runway principle of the bucket conveyor. The driving mechanism is practically identical with that utilized in conveyors, the mine cars taking the place of buckets. With the superposed track system the tippie requires only width for one track and walkways on both sides. Thus through the machinery section it is only 14 feet wide, and 12 feet wide at the approaches.

The erection of this tippie, which is apparently the last word in modern tippie construction, will set a standard of excellence for the Western coal mines. We congratulate the Crow's Nest Pass Coal Company on the prevision that has animated this progressive step.

### VON HAGEN.

We shall consider it a favour if any of our readers who have been induced to purchase stock in the concerns promoted by "Dr." Hugo Von Hagen will send us, confidentially or otherwise, a clear statement of their transactions. "Dr." Von Hagen is a cheap charlatan, and his mining schemes are fraudulent. The Canadian Mining Journal wishes to secure the specific evidence that is necessary to institute criminal proceedings against Von Hagen. Owners of shares in the Great Northern Coal Company, the Northern Coal Company, the Kent Coal Company or the Maritime Coal Company (New Brunswick) will be doing the country a service if they aid us in putting an end to Von Hagen's career.

### EDITORIAL NOTES.

In 1907 the deaths resulting from falls of roofs and coal in Westphalian collieries numbered 223. The death-rate was 0.953 per 1,000 persons employed. The average death-rate for the period 1885-898 was 1.170; for the period 1899-1907, 0.984.

Our contemporary, The Mining Journal, has decided to decrease the size of its page. No one will question the wisdom of this decision. Notwithstanding the valuable and interesting character of the pages of our London contemporary, the leaves are irritatingly hard to turn, and copies do not fit into any ordinary scheme of filing. Therefore the change will be welcomed.

The statement made by the promoters of the Black Lake Consolidated Asbestos Company to the effect that the new concern will have "friendly relations" with the Amalgamated Asbestos Corporation, has been contradicted unqualifiedly by Mr. E. B. Greenshields. It is unfortunate that a like regard for exact truth has not been evident in the matter published by Amalgamated itself.

Through error the review of Skinner's "Mining Manual" for the year 1909 was given as for the year 1908 in a recent number of the Canadian Mining Journal. The 1909 edition of this invaluable handbook was published on February 8, 1909. This was the edition reviewed. We may add that, for office reference, this volume is in constant requisition. In fact, it is practically impossible to get along without it.

Through the efforts of the West African Chamber of Mines during the past twelve months, the railway rates on the Gold Coast Government Railway were reduced by about 30 per cent. These reductions covered nearly all the important items that went to make up the supplies in constant use by the mining companies. From the Elder-Dempster Line, a shipping company that enjoys a monopoly of West African trade, no concessions were obtained.

At the Robinson mine, on the Rand, a large new mill engine is being installed. It will be of 2,000 hp. Its arrangement is novel. The high and low pressure cylinders, which are 33 inches and 66 inches diameter respectively, by 54 inches stroke, are not coupled in tandem. The crank shaft is coupled direct to the line shafting of the battery. A 1,350 kilowatt A. C. generator is placed on this shafting, so that when electric power is supplied by either of the new power supply companies this generator will be used as a motor, and the mill engine will be disconnected, at the coupling provided, and used as a standby. For the concrete foundations of the engine an excavation into the rock has been made, and about 16 feet of concrete will be put in place.



# IN THE MICHIGAN COPPER COUNTRY.

Written specially for the Canadian Mining Journal by R. E. Hore.

The copper deposits of Michigan present many points of interest. The profits derived from mining operations have been enormous, and in addition to making several great fortunes, are directly or indirectly the support of some thousands of people. The peculiar nature of the deposits, their great extent, the depths to which they have been worked, the heavy machinery

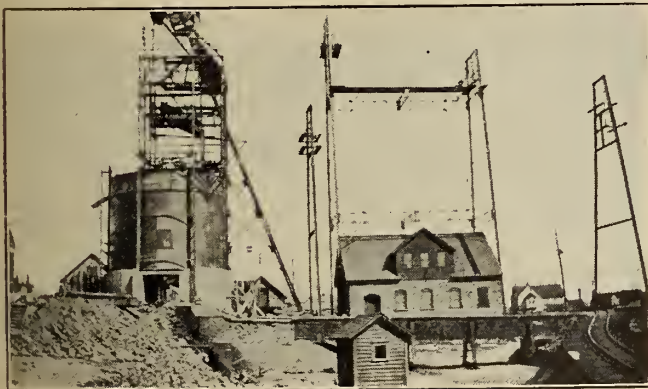


Calumet and Hecla Mines, Calumet—Looking north along one of the lines of shafts.

demanding, are some of many features which attract the attention of mining men. The extensive mining operations have afforded unusual opportunities for accurate determination of the character of the ore deposits.

In Canada there are known to be large areas of rocks similar to the copper-bearing series. In the greater number are on Keweenaw Point, the others on the extension of the Copper Range westward. The western group has not reached the importance of those in the vicinity of Calumet and Houghton.

Lake Nipigon region and at intervals along the north shore of Lake Superior there are formations which have been correlated with those of Keweenaw Point. Explorers of the far north have described copper deposits in rocks which are apparently identical with the Keweenawan. The information obtained in the ex-



Quincy Mine, Hancock—A new shaft-house; concrete and steel

tensive development of Michigan deposits will be invaluable to those who exploit similar resources in Canada.

## Location and Nature of Deposits.

The accompanying map (Fig. 1) shows the location of the chief mines of the Keeweenaw Range. The

The copper-bearing series is largely made up of lava flows, with which are interbedded some conglomerates and sandstones. The sedimentary rocks form only six or seven per cent. of the total thickness of the Keweenawan. The beds dip under Lake Superior, as indicated in Fig. 2. At Calumet the dip is 38 to 41 degrees, at Houghton about 56 degrees.

The tops of the numerous lava flows are generally amygdaloidal, and the bottoms show similar structures much less pronounced. Vesicular cavities have been filled with secondary minerals, calcite, quartz, and hydrous silicates being the most common. In some



"Blow off," Victoria Mine, on Ontonagon River. The Victoria is one of the pioneers to use hydraulic compressed air. The photo shows a column of water and air escaping from twelve inch pipe, shooting over one hundred feet above the opening.

cases the secondary filling is native copper, and this is one of the most important types of deposits—copper "amygdaloid." The "Kearsarge amygdaloid" is a very extensive lode of this nature.

The conglomerates are made up largely of material are very abundant in some of the beds. In some cases similar to the lava flows, but reddish felsite pebbles part of the cementing material is native copper, and this has afforded the richest of the ore deposits—



"copper conglomerate." The "Calumet conglomerate" is a good example of this class.

A third class of deposit is that of veins traversing the bedded rocks. These are yielding very little of the present output.

In working the conglomerates, owing to the loose nature of the material, a large amount of worthless rock has to be mined with the pay rock. The trap underlying amygdaloidal beds is of dense, compact character, and need not be removed. Consequently an

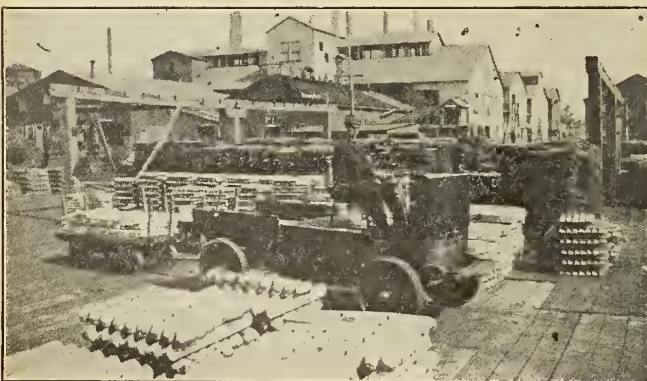


Dollar Bay Smelter—Showing piles of ingots ready for shipment.

"amygdaloid" lode may be mined with greater profit than a lode of same values in a conglomerate bed.

While a general plan like Fig. 2 indicates simple structure in the deposits, the workings are complicated by the occurrence of innumerable faults and changes in dip of the beds.

The great extent of the lodes is indicated by long lines of shaft-houses, which in some cases extend great distances. The "Kearsarge amygdaloid" is cupriferous in paying quantities for eleven miles, although everywhere the copper is irregularly distributed. The inclined beds have been followed down in some mines for eight or nine hundred feet. Some vertical shafts, including the famous "Tamarack" and C. & H. "Red Jacket," which cut obliquely across the beds, are one mile in depth.



Dollar Bay Smelter—Showing methods of hauling ingots from casting machine to dock.

While copper is found at these great depths, the deposits are as a rule less rich than those nearer the surface. Mining at the lowest levels has in many cases been carried on with but little profit, and at present the amount of ore which is raised from them is very small.

It is well known that the temperature in these lower levels is high enough to cause inconvenience to work-

men, even when scantily clad. The loss of values, however, has apparently been the only reason for the discontinuance of the work at great depths.

The low price of copper has seriously affected the mining of lower grade lodes in the last two years. Some of the companies operating on lodes yielding a very slight margin of profit had to close down. Others are drawing on their reserves of capital to further explore their deposits, while they wait for the price to rise again. Thousands of feet of diamond drilling has



Dollar Bay Smelter—Showing "mass" copper, which is brought directly from mine to smelter. Comparatively little of the copper mined is in such large nuggets.

been done, thereby adding much to the knowledge of the deposits, and making a few important discoveries.

#### The Mines and the Geological Survey.

Iron and copper are the chief of the metals mined in Michigan. The iron deposits are largely controlled by one corporation that has a number of geologists in its employ. The copper mines are owned by a large number of independent companies, large and small, and these find a connecting link in the State Geological Survey. The survey maintains a branch office at Houghton in the midst of the mining activities. State Geologist Lane is ever busy examining mine workings and drill cores in the endeavor to correlate beds and find lost lodes. From the information and the facilities for per-



Hauling concentrates four miles to railroad. Steep hills materially increase transportation expenses of some of the mines.

sonal examination given him by intelligent, far-seeing mine managers he accumulates a host of data useful both to miner and to pure science.

Director Brock, of the Geological Survey, is suffering from a diphtheritic sore throat. He has been in hospital for a week. The case is not serious.



# Annual Report of the Provincial Mineralogist for the Year Ending 31st December, 1908, Being an Account of Mining Operations for Gold, Coal, Etc., in the Province of British Columbia.

Like its predecessors, the Annual Report of the British Columbia Bureau of Mines ranks easily as the most complete and best arranged provincial publication.

## Progress of Mining.

The value of the mineral products of the Province for the year 1908 amounts to \$23,851,277, which is less than that of 1907 and 1906, but still considerably greater than that of any previous year.

The tonnage of ore mined in 1908 was the largest on record, and the average assay of the ore was slightly greater than that of 1907. But the average market value of the various metals for the year was much

mines, of which 59 shipped more than 100 during the year. The total number of men employed in metalliferous mines was 3,537—1,089 above ground and 2,448 below. This total is less than the actual number of men employed. A mine employing 12 men for four months is credited with four men for twelve months, and so on.

In seven mining districts, Coast and Cassiar, East Kootenay, Slokan, Nelson, Trail Creek, Lardeau and Trout Lake, and Bounday, there were 102 non-shipping mines, with a total of 157 men employed.

## Coal.

Nearly all of the coal mined during the year was produced by three companies—the Crow's Nest Pass Coal Co. in East Kootenay, and the Wellington Colliery Co. and the Western Fuel Co. on Vancouver Island. Several new collieries are soon to become producers.

Probably the most important of these new collieries is that of the Hosmer Mines, Ltd., at Hosmer, a few miles north of Fernie, in East Kootenay. The seams being opened up here are supposed to be the same series as those worked by the Crow's Nest Pass Coal Co. The plant is most extensive and modern. The company is an offshoot of the Canadian Pacific Railway.

In the same section of East Kootenay the Corbin colliery, at Corbin, on McGillivray Creek, has just been opened up. The company is associated with powerful railway interests.

In the Coast district, the new colliery of the Nicola Valley Coal & Coke Co. shipped 26,227 tons of coal during 1908. This production was limited by the market that the C. P. R. freight rates would allow it to reach, rather than by the capacity of the mines. The adjoining colliery of the Diamond Vale Colliery Co. produced 3,011 tons of coal. It is still in the development stage.

On Vancouver Island, the South Wellington Coal Mines, Ltd., near Nanaimo, and the Gilfillan Colliery at Wellington, produced small quantities of coal.

The gross output of the coal mines of the Province for the year 1908 was 2,109,387 long tons, and as 12,820 tons were taken from stock, it makes the total quantity of coal disposed of during the year 2,122,207 tons. Of this gross amount, 918,872 tons were sold for consumption in Canada; 567,274 tons were exported to the United States, and 29,883 tons were exported to other countries; making a total of 1,516,029 tons of coal sold.

In addition to the sales, 431,538 tons of coal were used in making coke, and 174,640 tons were consumed under colliery boilers.

From the 431,538 tons of coal, 247,399 long tons of coke were produced. - Of this amount 768 tons were added to stock. The net coke sales were thus 246,631 tons—209,317 tons sold for consumption in Canada, and 37,319 tons for consumption in the United States.

**Coast Collieries.**—In 1908 the coast collieries mined 1,226,182 tons of coal, and 13,921 tons were taken from stock, a total of 1,240,103 tons, distributed as follows:



Canada Zinc Co.'s Plant, Nelson, B.C.

lower. The effect of this drop in market price meant a decrease of \$3,966,826 in the total value of ore mined.

The tonnage of ore mined during the year 1908, exclusive of coal, was 2,083,606 tons, an increase over the preceding year of 279,492 tons, or 15.5 per cent.

This total tonnage was produced by the various districts in the following proportions:—

|                               |      |                     |
|-------------------------------|------|---------------------|
| Boundary . . . . .            | 71.6 | percentage of total |
| Rossland . . . . .            | 14.5 | " "                 |
| Fort Steele . . . . .         | 7.9  | " "                 |
| Coast District . . . . .      | 1.7  | " "                 |
| All other districts . . . . . | 4.3  | " "                 |

Boundary district shipped ore to the extent of 1,491,063 tons. Next came Trail division with 302,419 tons to its credit, and Fort Steele with 165,313 tons. All other tonnage records were individually below 50,000 tons. There were, all together, 108 shipping



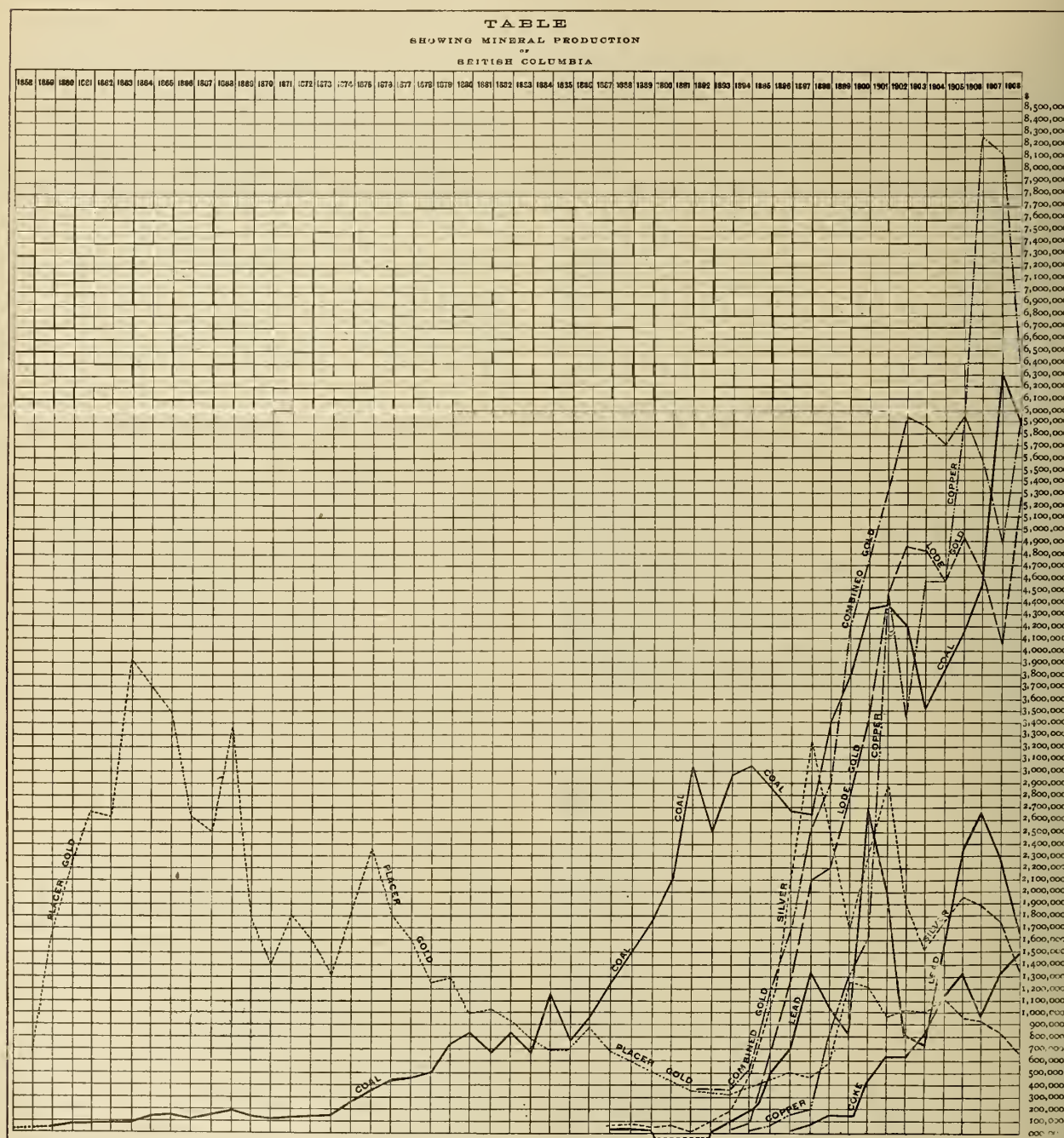
Sold as coal in Canada,..... 717,964 tons  
 Sold as coal in the United States, 300,445 tons  
 Sold as coal in other countries,.. 29,883 tons

Total sold as coal, ..... 1,048,292 tons  
 Used under companies' boilers, 120,523 tons  
 Used in making coke, ..... 71,288 tons

1240,103 tons

export sales to the United States, which in 1908 show a dropping off of 59,221 tons, or about 13.7 per cent., as compared with 1907, while, as compared with 1906, the decrease is still greater, amounting to 132,738 tons. These decreased sales are accounted for by the use of oil fuel in California, and, to a less extent, by the importation of coal from Japan.

The Wellington Colliery Co., the only coke producer, made 12,530 tons of coke, of which only 6,022 tons were



As compared with 1907, there is a decrease of 31,453 tons, 2.9 per cent., in the sales of the coast collieries.

The consumption of coal in that portion of British Columbia served by the coast collieries shows in 1908 an increase of 19,923 tons, equal to 2.85 per cent. The amount sold for export to countries other than the United States, shows an increase of 35.6 per cent.

The decrease seems therefore to be confined to the

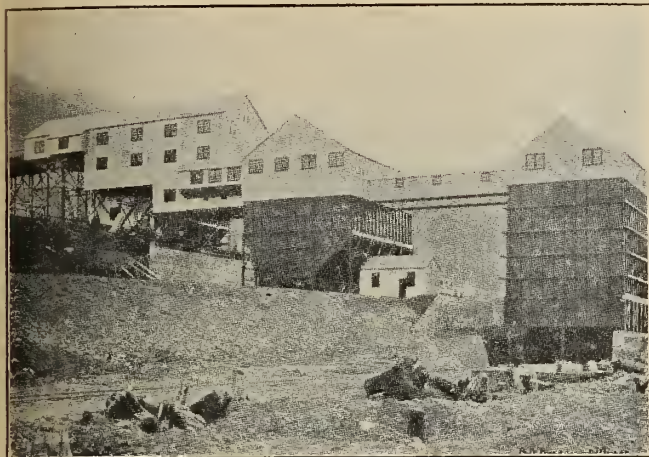
sold. Of this amount, British Columbia took 2,904 tons, the United States 3,118 tons, and 6,508 tons were added to stock. These figures show a great falling off in the consumption of coke in the coast section.

**East Kootenay Coal Field.**—In this field the Crow's Nest Pass coal Co. produced 876,467 tons of coal, of which 359,703 tons were used in making 234,098 tons of coke.



Hosmer Mines produced 2,627 tons of coal and 771 tons of coke; while the Corbin Coal and Coke Co. produced 4,111 tons of coal and no coke.

The gross production of the district was 883,205 tons of coal, of which 1,101 tons were still in stock at the end of the year, making the amount of coal dis-



Steel Tippie, Hosmer Mines, Limited, Hosmer, E. K.

tributed 882,109 tons. Of this amount 360,250 tons were used in making 234,869 tons of coke.

Distribution of coal was as follows:

|                            |              |
|----------------------------|--------------|
| Sold in Canada.....        | 200,908 tons |
| Sold in United States..... | 266,829 tons |

|                                  |              |
|----------------------------------|--------------|
| Total sold as coal.....          | 467,737 tons |
| Used in making coke.....         | 360,250 tons |
| Used under colliery boilers..... | 54,117 tons  |

882,104 tons

The total coke sales were made up of the 234,869 tons of coke produced and 5,740 tons taken from stock. 206,413 tons were sold for consumption in Canada, 34,196 tons for export to the United States.

The coke production shows an increase of 28,328 tons, or 13.7 per cent., as compared with the previous year. The total coke sales show an increase of 39,732 tons, or 19.7 per cent.; the coke sales in Canada show an increase of 64,426 tons, or 46.4 per cent.; but the coke sales to the United States show a decrease of 25,694 tons, or 42.9 per cent.

The Fernie fire and radical changes in the system of mine development at the collieries of the Crow's Nest Pass Co. retarded that company's output temporarily. In future, however, the output will be more regular and the mines safer for the workmen.

### Gold.

**Placer Gold.**—The production of placer gold in 1908 was about \$647,000, a decrease of \$181,000, or 21.8 per cent., as compared with 1907. The principal loss was recorded in the Atlin District, where this year's production was \$203,000, only half what it was the year before. In Atlin, the Atlin Consolidated Mining Company failed to operate, and the Pine Creek Power Company was enlarging its ditch, and therefore did no gravel-washing.

The Cariboo District—including Barkerville and Quesnel sections—held its own, and produced over half the placer output of the Province.

Dredging for gold has not been successful; the inland dredges at Atlin have been abandoned, and only a small amount of gold was recovered from the dredging done at Lillooet and Yale on the Lower Fraser River.

**Gold from Lode Mining.**—The value of gold produced from lode mining during the year 1908 was \$5,282,880, an increase of some \$1,227,860, or over 30 per cent. This large increase was principally due to Rossland, which produced this year \$986,806, or 50 per cent. more gold than in 1907, partly by increased tonnage, but chiefly through increased value of ores.

The Boundary District showed an increase in gold output of \$213,583, or about 12.7 per cent. Here the tonnage mined was 27 per cent. greater than in 1907, and the average tenor of ore smelted was slightly lower than in 1907.

Nelson District shows an increase of \$82,535, attributable chiefly to the activity of the gold-bearing properties in Sheep Creek camp, in the vicinity of Salmo.

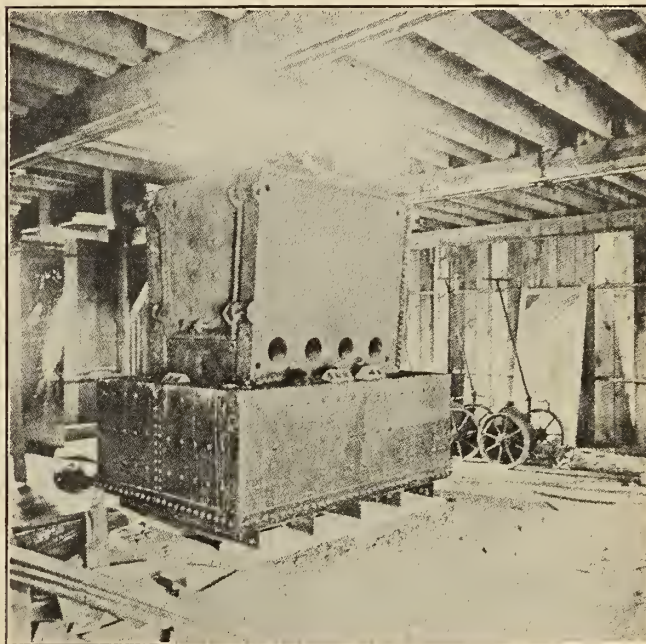
The only district reporting a large deficit in lode gold output was the Coast District, which produced \$58,744 less gold than in previous years.

About 87.5 of the lode gold output of the Province was recovered from the smelting of copper-bearing ores. The remaining 12.5 per cent. was recovered by stamp milling, etc.

### Silver.

The total amount of silver produced in the Province during the year 1908 was 2,631,389 ounces, valued at \$1,321,483, a decrease of 114,059 ounces, and of \$382,342 in value.

The average market price of silver in 1908 was 11.84



Electro-Thermic Furnace, Canada Zinc Co., Nelson, B.C.

cents per ounce lower than in 1907, which accounts for \$311,556 of the decrease.

About 77 per cent. of the total silver output was obtained from ores in which it was found associated with lead, the remainder being found chiefly in conjunction with copper-bearing ores.

The Slocan District supplied about 50 per cent. of



the total Provincial output, and the Fort Steele Division about 24 per cent., all from argentiferous galena.

The lead production of the Province was 43,195,733 pounds, having a market value of \$1,632,799. As compared with 1907 this is less by 4,542,970 pounds, or 9.5 per cent. The decrease in value is \$658,659, or 29 per cent.

The average market price for the year 1908 was a little more than one cent per pound lower than during 1907.

|                               |                        |
|-------------------------------|------------------------|
| Fort Steel M. D. produced.... | 30,204,788 lbs.=69.9%  |
| Slocan .....                  | 6,572,268 lbs.=15.2%   |
| Ainsworth .....               | 4,790,216 lbs.=11.1%   |
| Trout Lake .....              | 873,860 lbs.= 2.1%     |
| Nelson .....                  | 345,424 lbs.= 0.8%     |
| All others .....              | 409,177 lbs.= 0.9%     |
|                               | <hr/>                  |
|                               | 43,195,733      100.00 |

### Copper.

The output of copper in 1908 was 47,274,614 pounds, having a gross market value of \$6,240,249. This is the largest output ever made. It exceeds last year's production by 6,441,894 pounds, or about 15.7 per cent. The lower average market value of the metal for the year 1908 reduced the market value by \$1,926,295, or 23.5 per cent., as compared with 1907.

The average market price for the year was 6.8 cents a pound less than it was in 1907, a direct loss to the producers of \$3,214,674.

The great increase in production was made in the Boundary District, due to the increased tonnage of ore mined.

In the Coast districts a decrease of 1,760,630 pounds, or nearly 50 per cent., was reported.

This table of production gives the output by districts:—

|                                |                        |
|--------------------------------|------------------------|
| Yale (Boundary) District ..... | 40,181,790 lbs.=85.0%  |
| Rossland .....                 | 5,042,244 lbs.=10.7%   |
| Coast and Cassiar .....        | 1,997,337 lbs.= 4.2%   |
| Yale-Kamloops .....            | .....                  |
| Nelson .....                   | 53,243 lbs.= 0.1%      |
| Other districts .....          | .....                  |
|                                | <hr/>                  |
|                                | 47,274,614      100.00 |

The average assays of the copper ores of the various camps, based upon the copper recovered, were as follows: Boundary, 1.35%; Coast, 2.87%, and Rossland, 0.834%.

### Other Minerals.

There was no iron ore shipped during 1908. Only a small quantity of zinc ore was shipped. The favourable final ruling of the U. S. Treasury Board, which will admit zinc ore free into the United States, will mean increased shipments. The saving of platinum from alluvial gold washings is neglected on account of the high cost of operations.

Building stone quarries are few and far between. This industry has great possibilities. Marble, red brick, fire brick and fire clay, lime-silica brick, lime, and cement are attracting more attention.

Further notice of these commodities will appear in a later issue of the Canadian Mining Journal.

### STAR VS. WHITE.

Information has lately been received in British Columbia from London, England, to the effect that leave to appeal to the Privy Council against the decision of the Supreme Court of Canada sustaining the judgment of the Full Court of British Columbia in favor of the Star Mining and Milling Company, has been refused the defendant company, the Byron N. White Company.

This action, long referred to as the Star vs. White case, was one respecting the extra-lateral or apex right of the well-known Slocan-Star silver-lead mine near Sandon, Slocan District, British Columbia, owned by the Byron N. White Company, of Milwaukee, Wisconsin, U.S.A., of which company Byron N. White, of Spokane, Washington, is president and general manager.

The Slocan-Star group comprises a number of mineral claims having a total area of about 500 acres. The Star Mining and Milling Company, of which John M. Harris is president, owns some adjoining mining property, from which the Slocan Star took a quantity of ore under circumstances stated below.

The action was commenced in July, 1901, at Nelson, B.C., by Mr. Harris in the name of the Star Mining and Milling Company. He sued for the value of all ore taken out of the Heber Fraction and Rabbit Paw mineral claims by the Slocan Star management, and for a declaration of title and an injunction. The action has since been the subject of a number of appeals, both interlocutory and final, and has been before different courts in British Columbia and Ottawa about 74 days in all.

The first trial was held at Nelson, in February and March, 1904, and lasted 23 days. At that trial W. J. Elmendorf and Professor Parks, both prominent mining engineers, of Spokane, were the chief expert witnesses for the White Company, while Frank L. Sizer and R. M. Atwater, also engineers of high standing, of Helena, Montana, gave testimony for the Star Company.

The defendant company admitted its trespass upon the property of the plaintiff, but endeavored to justify it under its apex rights, claiming that it followed downward from its apex to the ore in question. The plaintiff on the contrary, contended that near the boundary of its property the White Company encountered a fault fissure and lost the Slocan Star vein, hence the continuity of its vein was destroyed; also, that the apex claimed by the White Company was the apex of the barren fault fissure and not of the Slocan Star vein, and did not connect with the ore in question. In opposition to this contention by the plaintiff company, the White Company maintained that the whole workings were in its vein that is, the Slocan Star vein. Many samples, models and plans were filed in evidence by both parties to the suit.

The trial was not at that time concluded, but was adjourned to allow of the conflicting theories being put to test by experimental work on the ground. S. F. Parrish, then general manager of the Le Roi mine, Rossland, was chosen by the court to superintend the work ordered, but by reason of his illness another mining engineer was, after many months' delay, required. The



defendant company opposed such a substitute appointment and, through its counsel, urged the Chief Justice to make a personal examination of the mine workings in question. After having examined the mine for himself, the Chief Justice refused to permit any experimental work to be done, as had previously been arranged for at the request of the plaintiff, and directed that the trial be proceeded with, which was done at Nelson, in July, 1905. Much evidence was taken, including that of S. S. Fowler, M.E., of Nelson, for the plaintiff company. Counsel for Mr. Harris pressed their motion for test work, but this motion was dismissed, and in November, 1905, the Chief Justice gave judgment in favor of the defendant, the Byron N. White Company. This was appealed, with the result that, in November, at Vancouver, the Full Court ordered that the test work applied for by the Star Company be done under the direction of court.

W. E. Zwicky, manager of the Rambler-Cariboo Mines, Ltd., of Kaslo, was selected to supervise this work, which resulted favorably for the Star Company. Upon this, counsel for the plaintiff company contended that every test made decisively established the correctness of the theories advanced by Mr. Harris' expert witnesses, and two judges of the court decided in favor of Mr. Harris, while one held an opposite opinion. So Mr. Harris' appeal against the judgment of the Chief Justice was allowed. Thereafter the White Company appealed to the Supreme Court of Canada, and this appeal was heard in Ottawa in October, 1908. The result was that on February 13, 1909, the unanimous judgment of that court was delivered, dismissing the appeal of the White Company and sustaining the judgment of the Full Court of British Columbia, which latter court had reversed the judgment of Chief Justice Hunter at the trial.

The position now is that John M. Harris, who is also largely interested in the valuable Reco mine, near Sandon, has a judgment giving him a clear title to the Weber Fraction and Rabbit Paw mineral claims, a perpetual injunction against the defendant's mining on his property, full damages for all ore taken from these claims and all costs of trials and appeals.

The refusal of the Judicial Committee of the Imperial Privy Council to grant the Byron N. White Company leave to appeal to the highest court in the Empire may be regarded as the last act in one of the most important, hardest fought, and most costly mining trials ever carried through in British Columbia. Its final conclusion will be welcomed in Sandon camp if it leads to a resumption of work on a similar scale to that of the old concentrating mill was one of the chief sources of commercial prosperity to the town of Sandon.

While many will heartily sympathize with Mr. Byron White in his eventual defeat after a long fight for earlier years when the payroll of the Slocan Star mine that he regarded as his rights, there is the consolation of knowing that he has been fortunate in another direction, in the discovery on another part of the Slocan Star group last year of the continuation of a fine shoot of ore first opened on the Richmond-Eureka property, which discovery indicates that the Slocan Star possesses probably \$500,000 worth of silver-lead ore of shipping

grade, the existence of which on the property was not previously known.

### SHEEP CREEK, B.C.

During the year 1908 over 200 new locations were made during the summer months in the Sheep Creek camp, Nelson Mining District, B.C. Practically all of these locations were within an area of four square miles.

The gold area extends twenty-five miles northeasterly from the Salmon River, and is approximately five miles wide. The formation is exposed to Mount Laska, ten miles from Proctor, on Kootenay Lake. The mountain range is easily approached by the narrow valleys of the tributary streams of the Salmon River. There is abundance of timber, and an unusually good water supply, furnishing cheap power for mining and milling. Last winter 20 carloads of ore, coming from different properties and from widely separated veins, averaged over \$100 per ton. On the north side of Sheep Creek oxidized ores are being produced at a depth of over 100 feet. On the south side unaltered sulphides are being mined at a depth of 300 feet below the creek bed, a total difference in altitude of over 2,500 feet.

The sulphides in the quartz consist of iron pyrites, occasionally a little galena and zinc-blende, and, very rarely, copper pyrite. The ores are treated in stamp-mills and concentrating tables.

Associated with the gold in the veins is the mineral wolframite.

During 1908 four properties on the Sheep Creek gold belt produced \$195,000 from a total of 11,600 tons of ore, an average of \$17 per ton.

### NEW STOPE MEASURE.

Mr. O. S. Tonnesen, of the East Rand Proprietary Mines, has invented an instrument for measuring the stopes, which promises to greatly facilitate the work of the surveyor. Mr. Tonnesen calls it the inclined angle method. By means of this instrument and a tape angles and distances are measured directly on the inclined plane of the reef. The instrument is called the "stereometer," and is so constructed that it will measure the true inclined angle between any three points without observing the horizontal and vertical angles, no reductions or calculations being required. It can be held in the hand when observing, and no cumbersome and difficult setting up is required. It may be used for graphical records or be read by a vernier. As this question of stope measurements has been one causing continual dissatisfaction between the miners and surveyors such an instrument will prevent much friction. This was the main cause of the late strike.

The Book Departments of the McGraw Publishing Company and the Hill Publishing Company have been consolidated under the corporate name of the McGraw-Hill Book Company. This is announced to be a consolidation for the making and selling of better technical books. The new concern will have larger and better printing, distributing, and selling facilities than heretofore.



## EUROPEAN COAL MINES.

Address Delivered Before the Coal Mining Institute of America, at Punxsutawney, Pennsylvania.

By J. W. Paul, Mining Engineer, Technologic Branch, United States Geological Survey, in charge of Mine Lighting Investigations and Rescue Work.

The subject, European Coal Mines, is one upon which many volumes have been written, many official reports made, and has been the occasion upon which Royal Commissions have made many inquiries.

Schools, universities, mining institutes, technical societies, testing stations, indemnifying and protective associations in Europe are a few of the institutions resulting directly from the coal industry.

It goes without saying that European mines are much older than mines in our country, and their exploitation has been made largely by native labour, representative of the integral society which furnishes the foundation for their laws and governmental policies with respect to protective measures for all classes of labour, especially mining.

It is not my purpose on this occasion to go into an elaboration covering all the important aspects of the mines in Europe. To do so would necessarily make this paper a lengthy one, and, I fear, somewhat tiresome. Again, the writer has some timidity in endeavoring to enter into a discussion of some important conditions affecting mine safety which have been matters of experimentation and discussion in Europe for the past thirty years.

The first duty of a government is to protect its citizens against all enemies which may cause injury by disease, accident, impairment of health or by attack of foreign foes.

All forms of protective measures entail a pecuniary tax upon the citizens of the government, whether the protection be for naval or military work, prevention of disease or accidents.

In the coal-producing countries of Europe special importance has been given to the adoption of measures which have for their purpose the minimizing of accidents of all classes within mines.

These protective measures are the result of many years' study of the conditions under which different classes of accidents occur and the adoption of practical methods for their prevention.

In most cases the adoption of precautionary methods has added to the cost of the production of coal, but by doing so additional people find employment and the accident list is materially reduced.

The question of discipline within the mines of Europe is frequently mentioned as one of the factors of safety which we have in far less degree in this country. In a large measure the discipline in European mines has been the outcome of many years of training the miners to recognize dangerous conditions.

This discipline does not approach the perfection obtained in the military organizations, but it is obtained in the same manner as in a military organization, by having a sufficient number of experienced and trained mine captains, foremen and bosses to frequently see each man while at his work and direct him as to the proper safety precautions to be observed should any dangerous conditions arise.

Such supervision of the mine work necessarily involves additional cost on each ton of coal which the

people and the industries of the country seem willing to pay.

In matters of statutory requirements and state or governmental inspection, the European laws are largely in the hands of government officials, who have authority to interpret the laws and promulgate regulations relative to their proper enforcement.

The inspectors, in general, have much authority in preventing dangerous practices, and in some countries they may use their discretion in preventing the use of all types of explosives within mines.

With reference to the installation of mine plants, the equipment and buildings as a rule are quite elaborate and constructed along lines of permanency, being mostly of fireproof material, a building practice quite in harmony with the regulations requiring all classes of buildings to be made of incombustible material.

Mine fires in European mines have in the past been the cause of loss of life, and in England and Germany they have resulted in the taking of many lives. Notably in Germany, at much expense, elaborate fire fighting facilities are provided, resembling in every particular a well-appointed fire brigade station, such as is maintained by some of our cities, having fire engines, horses and a crew of trained men.

For underground work of rescuing miners and combating fires, many stations are equipped with different types of rescue apparatus and men trained in their use.

In Austria a law requires that each mine shall be equipped with rescue apparatus, and at all times a certain percentage of the underground employees shall be trained in the proper use of the apparatus.

In France, a similar law is going into effect, and in Belgium, after July 1st next, the collieries will be required to be equipped with the apparatus.

In Germany, many rescue apparatus are kept at the mines, and at central stations where men are trained in the use of the apparatus.

In England, Scotland and Wales, mine rescue stations are established, and miners are being regularly trained.

Rescue apparatus in Europe appear to have passed the experimental stage, since in three of the important mining countries their use is required by law.

In Europe there has been much saving of life through the benefits derived from the several explosive-testing stations, where experiments have been conducted upon mine gases, coal dust and explosives.

In the countries of Great Britain, Belgium, Germany, France, Austria and Russia the Mine Inspector Departments, the operators, and manufacturers of explosives have for their guidance the results of tests made at their explosive-testing stations, and operators of mines are restricted to the use of certain types of explosives, while in Belgium and Austria certain classes of mines are prohibited from using explosives for any purpose within the mine.

As early as 1883 a station was constructed at Zwickau, Saxony, for the study of the effect of explosives when discharged in the presence of explosive gas



and coal dust. Since this was inaugurated the other stations in the different parts of Europe have been installed, and in Bohemia a station is installed underground, utilizing an entry in a tunnel which was excavated about the year 1800.

None of the foreign experimenters have as yet arrived at an acceptable explanation of the phenomenon of a coal dust explosion, although at all of the foreign stations coal dust explosions are produced without the admixture of explosive gas.

In those mines in Europe in which explosives are used for blasting the coal or rock, much attention is given to the condition of the part of the mine where a shot is to be fired with respect to the presence of coal dust and its conditions as to moisture.

Watering of the workings of the mines is practised systematically, being applied by specially constructed cars, by hose and nozzle and by spraying devices.

Much faith appears to be entertained in the wetting of the sides and floor at and within a certain minimum radius of the point at which an explosive is to be fired.

Experiments are in progress in England and Austria to determine the retarding of an explosion by the introduction in different parts of a mine of wet zones, inert zones, and dustless zones.

European countries are fully alive in a concerted endeavor to ascertain what additional safeguards may further curtail the loss of life and personal injury within mines.

Not being fully satisfied with the results already obtained, new and more elaborate testing stations are in contemplation in at least three of the European countries.

The safety lamps in use in the European mines and the manner of handling them are worthy of comment.

In England the lamps are carefully inspected before being taken into the pits, and upon reaching the bottom of the pit a mine official makes a careful inspection of the lamp to see that it is in good condition. It is forbidden to set a safety lamp on its bottom in any part of the mine. When a workman wishes to place his lamp to one side, he must hang it in a safe position.

In Belgium the lamps are looked over by an official on the outside of the mine to see that all of its parts are properly assembled, no test being made of the lamp to determine if it is defective.

In Germany the lamps are cleaned and locked and handed to the miners, who examine them to ascertain if they are in condition suitable for use. In Germany all lamps are without bonnets, to enable the miner to observe the condition of the gauze.

In Continental Europe at many of the gaseous mines each workman is his own fire boss or gas tester—that is, he tests his working place for the presence of explosive gas, and, if found, reports to the proper official. In this particular much reliance is placed in the competency of each of the underground men.

A station of much interest is to be seen within the Nordbahn mine at Maehrisch-Austrau, where a retreat-chamber is provided capable of accommodating three hundred men. This station is about a mile from the bottom of the shaft, and is so arranged that it may be closed with heavy doors and isolated from the atmosphere of the mine. Food, water, ventilation, light, telephones, rescue apparatus and medicines are provided.

In case of a mine fire or an explosion in any part of the mine which might prevent the escape of any living

miner, they may retire to this station and remain until rescued.

With the rescue apparatus in the underground station the men may do much effective work in combating the fire or recovering miners who may be in irrespirable air and unable without assistance to reach the retreating-gallery. This station is another evidence of the aggressive efforts being made to further reduce loss of life in Europe.

Of recent months it is not uncommon to learn of American mining officials traveling Europe making a study of the conditions pertaining to the safeguarding of life, so that it appears that we are beginning to realize that some of the practices in Europe may, with much profit, be adopted in the operation of our own mines.

### POWER AT COBALT.

(Specially Contributed.)

An interesting phase of the situation in Cobalt at the present time is the question of power, and several companies have been formed to supply air and electricity on a large scale to the mines of the district. It is believed that this will mean a great saving, as the present price of steam-generated power is very high. This is due largely to the high price of coal, which averages about \$5.50 per ton on the cars at Cobalt.

It is difficult to obtain reliable figures on the cost of power in the camp, but it is estimated that it will run from \$135 to \$175 per horsepower per year, while the general average will probably be above the \$125 mark. The advent of the power companies into the camp is being followed with close interest, as the rates they offer will probably cut present costs about in half.

A company that is attracting a good deal of attention at the present time is The Mines Power, Limited, who are installing a plant situated on the Matabiche-wan River close to Lake Temiskaming. The requirements of this corporation have been financed by Montreal capitalists, and the head office of the company is in that place. The capital is \$3,000,000, and as the money has been advanced by the promoters, there is no stock or bonds on the market for sale. The president is Mr. E. A. Wallberg and Mr. F. J. Bell is the general manager.

The powerhouse will be situated on the river already mentioned, about twenty-five miles from Cobalt, while the company have also obtained the right from the Government to dam up the waters of the lakes above the falls, as they see fit, to supply sufficient storage capacity in case the water in the river should fail. The dam above the powerhouse is being built of solid concrete, and will have a length of eight hundred feet and a height of forty-five feet. There will be two five-foot penstocks, while the working head will be 312 feet. It is estimated that a total of 15,000 horsepower can be generated.

The powerhouse will be a solid concrete building, forty by ninety feet, and will be fitted with travelling cranes. At present there are four separate generating units being installed. Each generator is rated at 1,875 kw., with a large overload capacity, and provision is being made for extensions to the powerhouse equipment. The units that are now being installed will supply the present requirements of the district. The generators are three-phase, sixty-cycle, 2,300 volts. The wheels are spiral case turbines, with a capacity of 2,750



horsepower each. These will be directly connected with the generators. There will be two exciter units, each with a capacity of 100 kw., and each exciter will be directly connected to a water wheel. To insure perfect regulation, high power governors are being installed. The step-up transformers are also of the three-phase type, and there will be four in the continuous service, with an extra as spare in case of accident. These transformers will increase the pressure to 44,000 volts. Two separate three-phase transmission lines are being constructed, each having a separate circuit. Aluminum is being used for the conductors, and these will be supported by high-tension porcelain insulators.

The right of way is being cut one hundred feet wide through the woods, and also all high trees on either side in close proximity, so that the wires may not suffer. For the delivery of the power three substations will be built. One will be in South Lorrain, with a capacity of 1,000 horsepower; one at Kerr Lake, with a capacity of 2,500 horsepower, while the remaining capacity of the plant will be at the other station at Cobalt. These stations will consist of three-phase step-down transformers, with the usual lightning arrester and switchboard equipments. The distributing system from the different substations will be three-phase sixty-

cycle 2,200 volts. At the Kerr Lake and Cobalt stations there will be electrically driven compressor plants, with spare units. At Cobalt the plant will consist of three direct-connected motor-driven three-stage compressors, each having a capacity of 4,200 feet of free air per minute. The plant will have extra large intercoolers and aftercoolers. The air will be delivered at 100 pounds, and atmospheric temperature through radiating pipe lines from the central station to the surrounding mines, and will be sold to the consumer on a meter basis.

On the upper lakes, dams are now being built, while on the powerhouse and the concrete dam there is a force of four hundred men employed. On the right of way three separate gangs are employed. The whole plant consists of practically duplicate units, and every precaution is being taken by the company to insure continuous service. It is expected that power will be ready for delivery by September 30th.

This company also intend to extend their transmission lines to Elk Lake and Gowganda. They also control the Kakake waterpower on the River Quinze, which power is being held in reserve for development as the market extends. This power alone has a capacity of about 40,000 horsepower.

## METALLOGENETIC EPOCHS.

By Waldemar Lindgren, Washington, D.C.

Paper Read Before the Canadian Mining Institute, Annual Meeting, Montreal, March, 1909.

The difficulties of a student of mineral deposits are increasing. As in petrography the first descriptive period of the science is drawing to a close. We know the principal types, and, though much remains to be done in detailed accounts, it seems that we are gradually coming to the same "impasse" which confronts the petrologist, who is now turning to the exact experiments of physical chemistry for the solution of the riddles which confront him. And as we transfer some of our most important problems into the same able hands for experimental work at high temperatures and pressures, some of us may confess to a slight feeling of disappointment that inductive work has failed to furnish definite answers to many of our questions. But such a state of mind should only be like the shadow of a passing cloud; for the study of mineral deposits is not a science distinct from others; it leans on all branches of geology as well as on chemistry and physics, and this new development means not only that we have taken a step in advance; that we have acquired a new and powerful collaborator; it means also still further specialization. It does not mean that the scientific services of the mining geologist will be unnecessary or futile. His work will be necessary to assemble and assort the facts, to test the results of the laboratory, to propound new problems, and to generalize from the study of wide areas.

This critical examination of mineral deposits over wide areas is a work which now confronts us. It is the geographic and historical side of our science. With some hesitation I venture to place before this Institute an epitome of the principal epochs of the segregation of metals over our continent. Many of the facts are well known to you and the only feature of this paper

which can possibly merit your attention is the summarizing of these well known facts.

This continent of North America is rich in metallic wealth; its total production exceeds that of any other equivalent division of the earth. Gold and silver come from the Cordilleran belt and also from the eastern margin of the continent. Copper in ever increasing quantities is derived from the Central Basin and from deposits in the west extending from Sonora to British Columbia. Lead and zinc are produced from our vast Mississippi basin and from the ranges of the Rocky Mountains. Half of the world's nickel is drawn from Ontario and a large part of the tungsten comes from Colorado. The total value of the metallic product of the continent in 1908 was about \$1,000,000,000.

In some measure we have succeeded in classifying the vast number of deposits, not only with reference to their mineralogical and structural characteristics, but also with reference to their age. We find that metaliferous deposits have been formed since the earliest times of geological history. We find also that they are not equally distributed over the continent, but occur in metallogenetic provinces of greatly different form and extent. Moreover, these metallic concentrations have not been going on at equal rates throughout geological time, but the formation of each group corresponds to fairly brief epoch which, with few exceptions, is also a epoch of vulcanism. No fact is better established than this, however much we may differ in details of genetic history. On the other hand, regions of vulcanism do not necessarily contain ore deposits. Naturally we find the ores in regions of uplift and erosion, for here the rocks are best exposed, but they are not necessarily connected with such warpings and corrugations, as is



illustrated by the oft-cited poverty in metalliferous deposits of the Appalachian ranges of sedimentary rocks.

Since the earliest times, then, metallogenetic epochs have recurred on the North American continent, and, comparing it with others, we must conclude that either the original sources from which the ores have been concentrated have been richer than elsewhere or the conditions for their formation have been more favourable than elsewhere.

### Metallogenetic Epochs.

In describing these epochs it will be convenient to separate the eastern and the western halves of the continent for, with exception of the earliest part of their history, they have little in common.

### Epochs of Ore Deposition in the Eastern Part of the Continent.

1. The Pre-Cambrian Period.—The Pre-Cambrian period embraces a very long time and many different epochs of ore formation; but for our present purposes it will be necessary to consider it as a whole. Ages of sedimentation alternated with violent igneous action. At many places long erosion preceded the deposition of the Cambrian. The Pre-Cambrian deposits form a belt along the southern Appalachians, extending northward into Canada, where they are found over a wide area. They occupy parts of Michigan, Wisconsin, and Minnesota, and re-appear in the west, in South Dakota, Wyoming, Colorado, New Mexico and Arizona; possibly also in south-western California, but with less of the diversity characterizing the Lake Superior region. In the latter region there is a great succession of igneous rocks, effusive as well as intrusive, ranging from granites to basalts, diabases and gabbros. In the Corbilleran region the intrusives are almost exclusively represented and the prevailing type is the normal red granite contrasting strangely with the later intermediate type of intrusives. Smaller amounts of intrusive diorite, gabbro and diabase are present.

The metals characteristic of this period are iron, copper, nickel, gold and silver. Lead and zinc appear to be present in far smaller quantities than in later periods. Quicksilver and antimony are rare. The iron ores are, as well known, of several types; the ilmenites and the magnetites are chiefly of igneous origin; the hematites of Lake Superior, according to Leith, of partly igneous, partly sedimentary origin, and ultimately oxidized and concentrated by surface waters. It is believed that this concentration took place mainly in Pre-Cambrian time. The copper and nickel ores are connected with basic igneous rocks, in part intrusive, in part, as in the Michigan copper region, of effusive type. The concentration of the copper of this latter region into workable deposits also seems to have taken place chiefly, if not wholly, in Pre-Cambrian time, and probably followed the close of the igneous activity in Keweenaw time. The silver veins of Cobalt, which have proved so rich, are likewise Pre-Cambrian and some writers are inclined to connect them with Keweenaw basic intrusives into Huronian rocks.

In the Southern States the deposition of the gold-bearing quartz veins in most cases directly followed granitic intrusions in various sedimentary schists. The assertions of earlier writers, that these veins are generally connected with basic intrusives, are not supported by recent work. Some silver and copper are associated with these gold-bearing veins. It should be

added that some writers assign a Cambrian or even later age to the southern granites. Minor copper deposits in the same region are chiefly derived from intrusions of diabase or allied rocks. Pre-Cambrian gold-quartz veins are also known from Western Ontario.

2. Epoch of Paleozoic Intrusives.—From New York and New England northward into Quebec and Nova Scotia granitic intrusions took place at various times during the Paleozoic as late as the carboniferous and were accompanied by some metallization. The gold-quartz veins of Quebec and Nova Scotia were in part, at least, formed after these intrusions and various small deposits in New England have a similar origin.

3. Epochs of the Sedimentary Iron Ores.—Processes of sedimentation under favourable conditions lead to concentration of iron ores. During the long period of unbroken Paleozoic sedimentation in the Appalachian region there were at least two epochs which are characterized by such iron ores. During the Clinton stage of the Silurian, persistent beds of low grade hematite were formed; and during the Carboniferous less important layers of carbonate black band ores were deposited.

4. Epochs of the Triassic Traps.—The important period of the history of the igneo-genetic ore deposits of the eastern part of the continent closed in the late Paleozoic and the majority of these deposits had been formed much earlier. A feeble recurrence of ore formation took place during the early Mesozoic, when the traps of the Eastern States were injected as sheets or overflowed as lava streams. Smaller masses of iron and copper ores developed along the igneous contacts, in part as veins, in part as contact meta-morphic deposits.

5. Cretaceous, Tertiary, or Later Epochs of Zinc and Lead Concentration.—Since the Triassic, vulcanism has rested and in the eastern part of the continent metal deposits have formed only by the concentrating power of flowing surface waters or of ground-water in decaying rocks, or of ascending waters of atmospheric origin.

In the central valleys, such ore concentration has been effected in comparatively late time, apparently independent of vulcanism, and has resulted in the most important lead and zinc deposits on the continent. Regarding the mode of origin of these deposits opinions differ widely, but most observers believe that the lead and zinc has been leached by surface waters from Paleozoic limestones which derived their sparsely disseminated content from the Pre-Cambrian northern continent. Some regard the process as a simple affair of downward percolating surface waters. Others attribute it to vigorous ascending circulation of atmospheric origin. The time of this concentration is thought to range from the establishment of a circulation dependent upon uplift, perhaps from the Cretaceous to the present time; but some geologists have not hesitated to say that ore concentration began in late Paleozoic or in Mesozoic time. Further discussion cannot be attempted here, but with reference to the theories just indicated it may be worth while to point out that lead and zinc deposits are very scarce in Pre-Cambrian rocks and the latter would hardly seem to be an adequate primary supply. There is undoubtedly much evidence in favor of concentration by ordinary surface waters, but the lead-zinc deposits in Kentucky and Arkansas certainly show transition into types, which closely resemble western types of veins, attributed to hot waters. The ores in the more important districts appear to convey the impression of sharply defined



depositional epochs, rather than of long continued action of cold waters descending from the surface.

### Epochs of Ore Deposition in the Western Part of the Continent.

The metallogenetic history of the Cordilleran region is more complex than that of the eastern half of the continent, but it is in some respects easier to interpret.

1. The Pre-Cambrian Period.—The Pre-Cambrian Period, as already mentioned, was productive of gold and copper deposits scattered from South Dakota through Wyoming, Colorado, New Mexico, and Arizona. South and west of this area the Pre-Cambrian is lacking; north of it, these old formations are present in places, but appear to contain no ore deposits formed during that period. In the Black Hills of South Dakota and in New Mexico some deposits referred to this group have been clearly shown to antedate the Paleozoic, and others in Arizona give strong inferential evidence of as great geologic age.

The Pre-Paleozoic gold deposits are generally lenticular quartz veins in schists, associated with heavy gangue minerals like tourmaline, garnet, etc. The copper deposits which usually contain chalcopyrite, are veins or irregular masses, the latter often of magmatic origin, but modified by dynamo metamorphism. Zinc blende is sometimes found with the chalcopyrite. Lead is almost wholly absent.

Throughout the Paleozoic, and the larger part of the Mesozoic the great interior province, now occupied by the Rocky Mountains, was the scene of almost uninterrupted sedimentation. Land areas existed here and there, but the igneous forces, so active over the whole country in pre-Cambrian time, were quiet for ages.

Not so along the Pacific coast; for here we find in places evidence of intrusions and lava flows dating back to the early Paleozoic. As yet it has not been shown that mineral deposits of that date exist along the coast.

2. The Early Mesozoic Epoch.—Between the Carboniferous and the Triassic, uplifts and folds had raised the Paleozoic sediments and the early Mesozoic beds were deposited uncomformably on the older rocks. Some time during the Triassic an epoch of intense igneous activity began and continued through the Jurassic. Basic lavas, mainly of the types of diabases and andesites, were erupted, largely as volcanic flows, from California to Alaska. A distinct epoch of metallization, principally yielding copper deposits, accompanied or followed these eruptions. We shall not err greatly in ascribing some copper deposits of California, British Columbia, and the Copper River region in Alaska to this, the second metallogenetic epoch definitely recognized on the Pacific coast.

3. The Late Mesozoic Epoch.—The third and most important epoch followed the intrusions of the great batholiths of the Pacific coast to which an early Cretaceous age is generally assigned. These intrusions of intermediate quartz-monzonitic or granodioritic character took place upon a scale difficult to grasp in its immensity. The present exposures show two main granitic masses, possibly connected beneath the Tertiary lavas. The southern batholith extends through California, the northern batholith stretches from Washington up through British Columbia to Alaska. Another smaller mass now occupies the central part of Idaho. Innumerable intrusives of less volume broke through the crust in Southern California, Southern Arizona, Western Nevada, Oregon, and elsewhere. The age of

the batholith of Western Montana is somewhat in doubt, it may belong to a later epoch. But throughout this revolution and the birth of the mountain ranges on the coast, the Cretaceous was being quietly deposited at sea level all over the eastern Cordilleran region.

An epoch of intense metallization followed these intrusions, within the areas indicated. The great interior masses of the batholiths are usually free from deposits, as shown in the High Sierra, in the Clearwater region, and in British Columbia. But along their margins mineral deposits formed in abundance, as along the gold belt of California, and along the two contacts of the batholith of the Canadian and Alaskan coast regions. The latest researches by the Alaskan division of the United States Geological Survey indicate that the great placer fields of Alaska derived their gold from deposits of this epoch. Gold, primarily, and copper, secondarily, are the characteristic metals. Along the Pacific coast, where there is little limestone in the intruded sediments, lead is practically absent, but in the interior, as in Nevada and Idaho, where the intrusions came into contact with Paleozoic limestone, this metal, with zinc, begins to appear. Silver is everywhere present, but scarcely ever important, except where lead appears. Arsenic and antimony are not abundant, mercury is nowhere present in commercial quantities.

4. The Early Tertiary Epoch.—As if exhausted, the igneous forces appear to have rested until the close of the Cretaceous and then broke out in a new field, along the eastern margin of the Cordilleran region, at that time largely covered by a plastic mantle of Cretaceous shales and sandstones, several thousand feet in thickness, which rested on great accumulations of Paleozoic limestones.

The predominating magmas were again of intermediate character, and solidified as granular or porphyritic rocks, standing between the granites and the diorites; they contrast markedly with the potassic and acidic magmas of pre-Cambrian times. While it is not necessary to limit strictly this igneous activity to a certain time, there is little doubt that most of it took place in the Eocene. The eruptions mainly took the form of intrusions and largely that of laccoliths, undoubtedly because, unlike the conditions of the shattered rocks of the Pacific coast, they were covered by this heavy, tough and still yielding mass of Cretaceous sediments. We find an enormous number of these intrusions as sheets or laccoliths at various horizons between the Cambrian and the Cretaceous or as dikes or stocks that break through the underlying pre-Cambrian. They are rarely comparable in extent to the great batholiths of the coast. They occur from British Columbia, through Montana, Colorado, New Mexico, eastern Arizona, and probably attain their greatest development in eastern Mexico. For reasons already indicated many, perhaps most, of these intrusives never reached the surface. Only in a few cases, as in Montana and in Colorado, near Denver, do the strata of Laramie or Eocene age contain volcanic detritus.

The third Cordilleran epoch of metallization followed these intrusions; contact metamorphic deposits and veins were formed in abundance around their margins. The characteristic metals are silver and gold with much lead and zinc, especially where the intrusions cut the limestones. Copper and iron are also present at such limestone contacts. Arsenic and antimony are far more in evidence than during the second epoch, but mercury is still absent.

5. The Late Tertiary Epoch.—Orogenic disturbance



followed the intrusions; the whole Cordilleran region was lifted high above sea level, warped, and faulted. These disturbances may have facilitated sub-aerial eruptions; at any rate it is certain that the middle and close of the Tertiary witnessed outflows of lavas upon a magnificent scale.

These eruptions spread over a large part of the western part of the continent; less pronounced in British Columbia and Alaska, they are abundantly represented in California, Washington, Oregon, Idaho, Colorado, Utah, Nevada, New Mexico, Arizona, and attained their greatest development in Mexico. Andesites and rhyolites are the predominating rocks. In some places the flows attained such thickness that during the later part of the volcanic epoch intrusions of magmas consolidated in them with granular structure.

During these eruptions, not strictly contemporaneous throughout, a fifth metallization took place, of which the characteristic metals are gold and silver. These deposits were often of great richness which is further accentuated by secondary processes; in fact most of the "bonanzas" belong to this class. Lead and zinc are not conspicuous except where the metallization took place in limestone. Copper is not abundant. Tellurium and antimony are common. Not that they are absent in older metallizations, but they, especially tellurium, seem particularly characteristic of this epoch.

Large areas of volcanic rocks are barren. The metal deposits seem to have formed only near or at the foci of igneous activity, where connection could be established with underlying magmas. The most recent eruptions were mainly basalts, and these, except in one case, do not seem to have been affected by metallization.

6. The Post-Pliocene Epoch.—The youngest metallogenetic province is that of the Pacific coast line. It is of very late age—Post-Pliocene apparently, and is characterized by mercury accompanied by few other metals. It developed in the coast ranges of California, following basalt eruptions and contemporaneous with it was a great development of hot springs. In part the deposition goes on at the present time.

Note that the quicksilver did not develop simultaneously with the birth of the coast ranges; these are much older, and an active circulation of atmospheric water was undoubtedly established long before the quicksilver deposit was formed.

7. Cretaceous or Later Epochs of Copper Concentration in Sedimentary Rocks.—In addition to these six classes, whose connections with igneous rocks are indubitable, the disseminated copper ores of the south-west should find mention. They occur in sandstones, shales, or conglomerates ranging from the Carboniferous to the Cretaceous, and, in most cases, chalcocite is the primary ore; frequently small amounts of silver are present. New Mexico, Arizona, Utah, Colorado, and Texas offer numerous examples of this class. While their origin is not wholly clear, many observers believe that they represent concentration by groundwaters of small amounts of copper originally derived from the pre-Cambrian deposits and since distributed through late sedimentary beds.

Summing up, we have then in the Cordilleran region:—

|                                                            | Principal metals.                                 | Principal rocks associated with deposits.     |
|------------------------------------------------------------|---------------------------------------------------|-----------------------------------------------|
| 1. Deposits of Pre-Cambrian period.                        | Gold and copper. . . . .                          | Granites<br>Diorites, gabbro                  |
| 2. Deposits of early Mesozoic epoch .                      | Copper . . . . .                                  | Basalt, diabase<br>Gabbro                     |
| 3. Deposits of late Mesozoic epoch .                       | Gold . . . . .                                    | Granodiorite<br>Quartz-monzonite              |
| 4. Deposits of early Tertiary epoch..                      | Gold, silver. . .<br>Copper, lead, zinc . . . . . | Granodiorite<br>Quartz-monzonite<br>Monzonite |
| 5. Deposits of late Tertiary epoch..                       | Gold, silver. . .                                 | Andesite<br>Rhyolite                          |
| 6. Deposits of Post-Pliocene epoch . .                     | Quicksilver . . .                                 | Basalt                                        |
| 7. Cretaceous or later concentrations in sedimentary rocks | Copper . . . . .                                  | Sandstone, shale<br>Conglomerate              |

As the surface of the earth is brought near to any deposit by the erosion of covering rocks, the chemical action of descending oxygenated groundwater, finally also the transplanting activity of running waters, are brought into play. Enrichment by simple oxidation or by the formation of secondary sulphides may then take place. Migration of metals into adjoining rocks may also follow. The heavy indestructible minerals will be sorted out and accumulate in the gravels of adjoining streams. In short, each primary deposit may be the parent of several of secondary grade, and the later are usually the richer. But the secondary deposits cannot be classified on the same basis as the primary, for groundwater and surface streams may at the same time attack deposits of widely differing age, and, under favourable conditions, such secondary migrations may be in progress at a given primary deposit for long periods of geological time.

Several observers have noted that the character of metallization appears to vary with geological time. In the above summary, this is illustrated by the almost exclusive appearance of important quicksilver deposits in recent epochs. Others have laid emphasis on the varying depth below the surface at which the deposition took place, maintaining, for instance, that, because certain sulpho-salts of quicksilver are easily soluble, they would remain in solution in the ascending waters until the surface had nearly been reached. Neither view, probably, contains the whole truth. It is evident, for example, that many deposits of gold, silver, and other metals have been formed near the surface in volcanic regions, in which quicksilver is wholly absent.

In deposits that are clearly connected with igneous rocks metallization is certainly a function of varying pressure and temperature; these factors being dependant upon depths below the surface and other conditions; metallization is also dependent on the nature of the rocks in which deposition takes place. Primarily, however, it is probably a consequence of magmatic differentiation.

It is well established that magmas of different types contain different associations of the rarer metals. For instance, tin and tungsten characterize acidic rocks, while nickel and cobalt are found chiefly in magmas rich in ferro-magnesian constituents. At the same time rocks of a given general composition may, in different



localities, vary considerably in the quantity of rarer metals contained.

Our knowledge of the content of rarer metals in igneous rocks is fragmentary, but it is at least often the case that ore deposits formed after the eruption of an igneous rock will contain the rarer metals characteristic of it. It may be true that for each differentiated rock type there are corresponding types of deposits, varying with the conditions of deposition.

As periods of long continued differentiation may materially modify the composition of a magma it is

conceivable that this might find expression in a progressive change in the character of ore deposits successively formed during these periods. The quicksilver deposits of California, for instance, may be the ultimate result of such long continued differentiation.

Perhaps it may be thought that the limits of epochs of metallization have been drawn too closely in this paper. It is freely admitted that in many cases there may be room for doubt. But if this opening of the question will stimulate discussion of a vital subject it will have achieved its most desired result.

## SOUTH LORRAIN SILVER AREA.

Abstract of Report by A. G. Burrows, Ontario Bureau of Mines.

This area first attracted attention in December, 1907, when a promising discovery of native silver was made on a claim now known as the Keeley mine (H. R. 19). A rush followed this discovery, and soon almost the whole area was under staking as mining claims.

The central portion of South Lorrain is about sixteen miles southeast of the town of Cobalt. The camp is most easily reached during the open season, by steamer from Haileybury, from which town it is distant about twenty-two miles. Communication is continued during the winter, over a sleigh road on lake Temiskaming. A government wharf has been constructed just north of the townsite of Sixty-six. From the latter place, a good wagon road extends westerly, by way of Loon lake, a distance of three miles, to the Keeley mine. Another road has been built by the Ontario government, just north of the wharf, and opens up another stretch of country. From these roads, old timber roads or trails may be followed to any part of the area. Lumbering has been carried on for years, so that almost all the pine has been removed. During the past season, serious forest fires destroyed much timber, which would have been suitable for mining purposes.

### Topography

The surface of the country is rough and hilly, and many small lakes lie in the depressions. The shore line is bold, and the hills rise abruptly from the lake. The hills and ridges are conspicuous features, and are generally found to consist of one geological formation. In consequence, the contacts are usually in the valleys and covered. This fact is well exemplified by a glance at the map, which shows almost all the lakes to lie in contact plains.

In following the road from lake Temiskaming to the Keeley mine, there is almost a continuous ascent. The shaft at the Keeley mine has an elevation of 571 feet and the bridge south of Loon lake an elevation of 323 feet. These elevations are relative to the level of lake Temiskaming on July 15th, 1908, when the water in the lake was higher than the average. The high water elevation of lake Temiskaming is 592 feet above sea level.

### Classification of Rocks

In this area, the formations are found to conform to the scheme proposed by Dr. W. G. Miller for the Cobalt area. The writer did not, however, see any unconformity between the quartzite-arkose series and the conglomerate-slate of the Huronian formation:—

Glacial and Recent—Boulder-clay, sand, gravel, etc. Great unconformity.

Post-Middle Huronian—Diabase. Igneous contact. Huronian—Quartzite, arkose, conglomerate, slate, breccia. Great unconformity.

Laurentian—Syenite, granite, intrusive into the Keewatin, but not into the Huronian. Igneous contact.

Keewatin—An igneous complex, chiefly basic igneous rocks together with acid porphyries.

### Glacial and Recent

Over considerable of the area, there is a covering of drift, carrying the usual glacial boulders. On the summits of the ridges, the drift is sometimes very deep. The rock exposures are usually found along the slopes of the hills, where the drift is thinner. On the shore of lake Temiskaming just south of the townsite, the fine-grained rocks well preserve the glacial striae. On the main shore, just opposite a small rocky island, the striae are very striking, and are due south (magnetic). At other points along the shore, there is a little variation to the east or west of south.

In the cutting of the government road just east of H. R. 69, the clay shows a stratified arrangement. Clay hills are seen along the shore of the lake, to the mouth of the Montreal river. Five miles up the river, the clay hills are high and much cut by deep ravines.

The total distribution of the drift is not shown on the map, but only where the working out of the contacts was seriously interfered with.

### Diabase (Post Middle-Huronian).

This formation has its greatest development in the central portion of the area, extending westward from lake Temiskaming, around the north end of Loon lake, southwest to the east side of Trout lake, and north almost to the Lorrain boundary. In this area it occurs as a very prominent ridge. A smaller area is seen in the northwest portion, where it is associated with the quartzite. In appearance and texture the diabase is very similar to that described in Dr. Miller's Report on the Cobalt Area, Third Edition, and is essentially a quartz-diabase.

A marked occurrence of the diabase is a dike, about five chains in width and traceable for two miles, intruding the quartzite. This may be seen east of G. F. 26, and a short distance south of the Lorrain boundary. The dike is very fine-grained on either side, and towards the centre has the normal diabase appearance.



There are smaller patches of diabase in the basic Keewatin areas, and these are difficult to distinguish as to age. Some of them are undoubtedly of the same age as the post-Huronian diabase, but, owing to the difficulty of separation from the other rocks, are not shown on the map. A thin section of a diabase associated with the Keewatin on R. L. 468 shows rather fresh plagioclase set in the augite. The latter is greatly altered to green hornblende (uralite). Some grains of quartz are seen in the section.

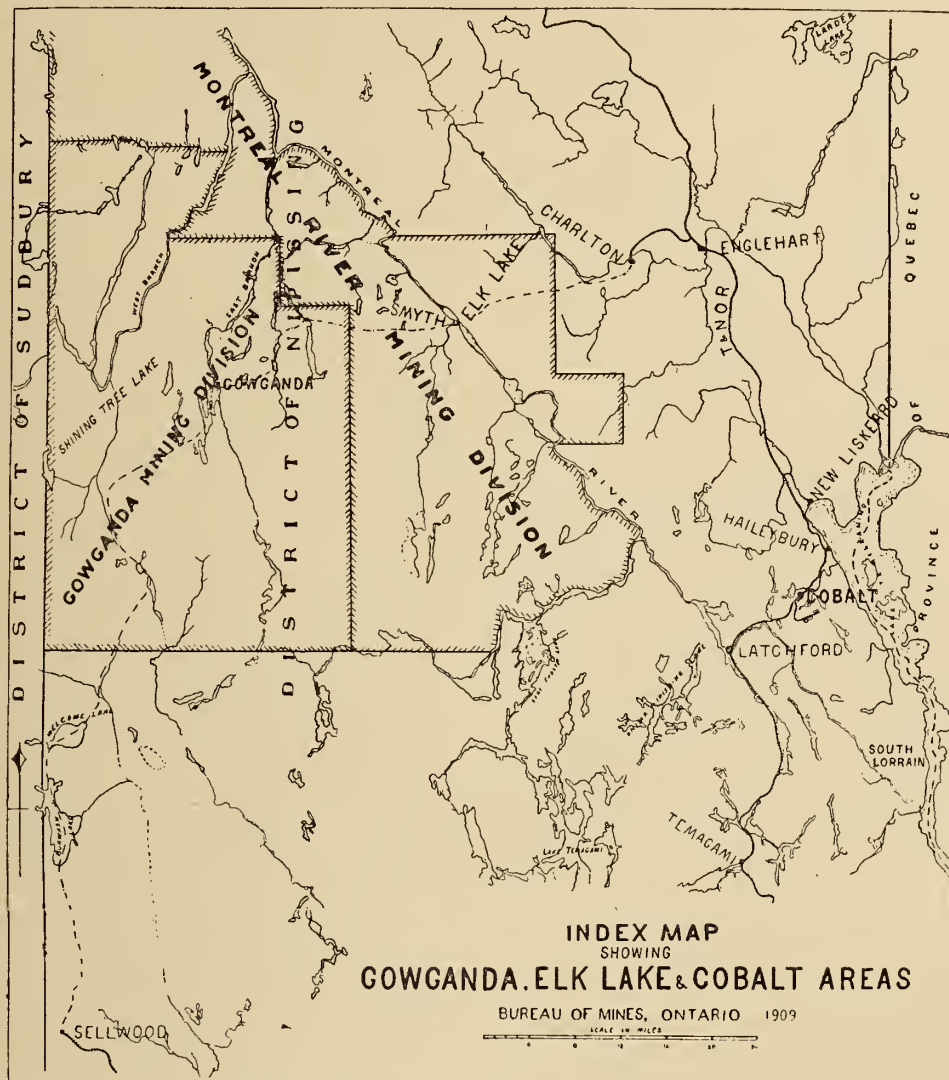
Along the north line of G. F. 12 there is a reddish granitic rock, which is apparently of the same age as the diabase, and a separation from the same magma.

river, the rock is a greywacke-conglomerate. South of Trout lake on H. R. 163, in a high rounded hill, coarse boulder conglomerate overlies well-banded slate. At the south end of the same lake and to the east, conglomerate and slate overlie the Keewatin, which shows in a bluff, and at a higher level than these in the post-Huronian diabase.

### Greywacke

Just west of the No. 3 post of H. R. 34 is an outcrop of greywacke which overlies the Keewatin and is overlain to the west by conglomerate.

The greywacke, which is deceptive in appearance, was mistaken by prospectors for fine-grained diabase.



Map showing position of South Lorrain in relation to Cobalt.

### Contact with the Huronian

Just north of the Keeley mine road, and west of Trout lake, on G. F. 13, the intrusive diabase (to the west) overlies the Huronian slate, at a high angle.

### Huronian

The predominating rocks are conglomerates and quartzites. The southern part of the area is composed essentially of conglomerates, varying considerably in appearance. The usual variety is that containing sub-angular and rounded boulders of granite, syenite and greenstone of varied size, in a groundmass of greenish porphyritic material. At the "notch" of the Montreal

### Quartzite and Arkose

The quartzite and arkose have a great development in the north and west portions of the area. They are varied in color and texture, but are usually rather medium-grained, and the lines of stratification are not very noticeable. The prevailing colors are greenish, grayish, and reddish, and, in this area, the green variety is usually rather friable, whereas the red variety is hard and compact. These varieties seem to pass gradually one into the other on the same ridge. The chief constituents are quartz and feldspar, which are occasionally present in large angular fragments. The green color is due to the presence of sericite, an alteration product

of feldspar, and was first noticed in the sea-green quartzites along the shore of lake Temiskaming. When the rock is coarse it is difficult to distinguish in the field from granite, particularly when the red feldspar is present.

In this area the prevailing dip of the Huronian rocks is to the west, varying to the northwest. Near the No. 1 post of L. O. 144, the slates dip to the west at an angle of 20 degrees. One mile west along the Keeley road from lake Temiskaming, and on H. R. 30, the slate and quartzite strike northeast and southwest and dip to the northwest. In the northwest portion of the area, near the No. 4 post of T. C. 77, the slates and quartzites dip to the southeast.

A breccia in situ is seen just east of No. 1 post, R.S. C. 68. It is composed entirely of small angular fragments of greenstone, which is seen in place to the south. This is the lowest portion of the Huronian seen in this area.

West of the Keewatin area, which is shown to the north of Trout lake, the Huronian rocks have been laid down in the following order. The Keewatin is usually overlain by a conglomerate, sometimes slaty. Above this, there is a narrow band of reddish banded slate, rather quartzose toward the upper portion, and overlying the latter there is a large area of quartzite and arkoses, with very little evidence of stratification. The breccia, mentioned above, was only noted at the one point in a very small outcrop.

#### Laurentian

The Laurentian is represented in the northeast portion of the area, by a reddish hornblende syenite, in which flesh-colored feldspar and greenish black hornblende are easily recognized. The hornblende is the common green variety, very pleochroic, and shows the distinctive prismatic cleavage and angles of the amphiboles. Quartz is present in smaller grains than the feldspar, and is not prominent enough for a granite. Sphene and magnetite occur as accessory minerals.

Throughout the syenite are rather rounded patches usually darker in color, but composed of the same constituents. These are basic secretions from the original magma, formed during the process of cooling. There are also some very small patches which are apparently remnants of a conglomerate formerly overlying the syenite.

Where the syenite comes in contact with the Keewatin to the south, it is found to be younger, enclosing fragments of the greenstone, and occasionally intruding for some distance, the older rock. On L. O. 153 the syenite is intruded by a very basic trap dike, ten feet wide and striking east and west.

#### Keewatin

The rocks of this series occur in several isolated areas. They are usually altered basic igneous rocks, both massive and schistose. The largest exposure extends N. N. E. from Trout lake for two miles. These are, in great part, greenish weathering rocks. The most typical portion is fine-grained, with a slaty appearance when fractured. Throughout the fine-grained rock are bands of coarser varieties, now much altered to amphibolite.

Just south of Loon lake on H. R. 57, the Keewatin is represented by very coarse massive amphibolites, which are highly mineralized with magnetite and iron pyrites.

Quite different in appearance from those above mentioned are the metamorphosed rocks three-quarters

of a mile south of Loon lake, and extending from H. R. 114 to lake Temiskaming. These are seen as highly tilted bands, with a general strike a little north of east and almost vertical dip to the north. At the west end of this belt the prominent rock is light colored, weathering to an ashy gray. When freshly broken it has almost a cherty appearance and is exceedingly fine-grained. Locally it is much twisted and crumpled. Thin sections of two samples of this rock showed the original character to be entirely destroyed. The constituents are exceedingly fine-grained and secondary, consisting of quartz, feldspar, chlorite and hornblende or mica.

Folded in the bands of this schistose rock are small dikes of light colored porphyries, showing phenocrysts of reddish feldspar.

A thin section from one of these dikes, near the No. 1 post of H. R. 114, shows phenocrysts of orthoclase and plagioclase, traversed by numerous small veinlets of epidote and hornblende. The groundmass is a granular mixture of feldspar and quartz, with needles of hornblende. Other dikes of porphyry are much fresher in appearance and seem to be younger in age.

On following this belt to the east, the rocks become darker in color and more chloritic. On H. R. 186, is typical chlorite schist, striking E. N. E., and dipping to the N. N. E. at a high angle. This rock breaks in curved cleavage plates, and is traversed by numerous small torsion cracks, filled with calcite. On H. R. 1 and 120 the schist is intruded by a large dike of white weathering porphyry with colorless phenocrysts of feldspar and quartz.

Small veins of quartz, impregnated with iron pyrite, cut the schist in this vicinity. On H. R. 140 one of these carries low values in gold.

There is a belt of somewhat similar Keewatin rocks immediately south of Oxbow lake.

#### Keewatin West of Point Fine

The formation consists principally of rusty, metamorphosed, basic igneous rocks, which may now be classed as amphibolites. In several thin sections, the ferromagnesian mineral is shown to be green secondary hornblende. Just north of No. 1 post R. L. 469, the amphibolite is much intersected by veinlets of rusty quartz and iron pyrites. These veinlets stand out very strikingly as a ribbed structure from the dark rock. A thin section of the rock shows it to consist of small rods and patches of green hornblende, partly in parallel arrangements, grains of epidote and clear secondary feldspar. The original character of the rock is obliterated. On H. R. 74 much of the rock is very fine-grained and intersected by veinlets of epidote and iron pyrite. A thin section shows the rock to be an alteration of fine-grained diabase, as the ophitic texture is shown clearly in the rods of altered plagioclase. The albite twinning in the feldspar is occasionally seen. The augite has been altered entirely to green hornblende. A coarser grained rock, outcropping near the No. 1 post of R. L. 465, has resulted from the alteration of gabbro. The feldspar is now altered to saussureite minerals, and the pyroxene has changed to a very pleochroic green hornblende, now showing with ragged outlines and bent forms. Only occasionally in this belt do the rocks show a schistose structure.

#### Discoveries

The principal discoveries have been made near the line of contact of the post-Middle-Huronian diabase and the Keewatin in the area to the north of Trout lake.



along this contact, usually within a quarter of a mile, discoveries of native silver or smaltite have been made in both formations. The Wettlaufer veins are in the diabase, whereas the Keeley veins are in the Keewatin. Toward the north end of this belt the discoveries so far consist of smaltite and niccolite. Small showings of native silver have been found in other isolated areas of the Keewatin or diabase. The writer does not know of any discoveries of native silver in the conglomerate or quartzite, although both these rocks are seen in contact with the post middle-Huronian diabase. In this respect the conglomerate of South Lorraine resembles that around Elk lake, in which no native silver discoveries, as far as is known, have been made.

In the following is a description of a few of the promising veins on some of the properties:—

On the Wettlaufer claim, H. R. 85, there have been found three parallel veins with a strike N. E. and S. W. Of these, the two northerly veins have rich shoots showing native silver in sheet form, while the south vein carries smaltite with low silver values. The veins are narrow, but parts of them attain a width of six inches. Flake silver is shot into the diabase wall rock from one to three inches. The distance from the north to the south vein is about ninety feet. A shaft is being sunk in the north vein and the intention is to crosscut to the other veins.

At the Keeley mine, H. R. 19, considerable development has been done. At the shaft on the main vein, No. 1, the strike is S. 62 E. The silver occurs in wire form, flake-like sheets and hair-like tufts, associated with smaltite in a gangue of quartz and calcite. Quartz is very prominent in the vein, and is associated with the best values.

The following additional information is supplied by Major Boyd Magee, superintendant of the property. "The main shaft on the original discovery has been sunk to a depth of 133 feet. At the 65-foot level, 220 feet of drifting has been done on the vein, and about 10 tons of shipping ore have been taken out and bagged. The shaft is in the Keewatin formation. Dikes of old diabase have been encountered. At a depth of 130 feet, a crosscut is being driven to catch the main vein which dipped from the shaft at a depth of 78 feet. Associated with the ore is more or less cobaltite. A sulphide of copper and silver, probably stromeyerite, has been found in the No. 1 vein. No. 3 shaft sunk on a cobalt vein has run into shipping ore at a depth of 30 feet."

A sample of massive ore from a vein near the west side line of this property, analyzed by Mr. N. L. Turner, Provincial Assayer, shows it to be smaltite-chloanthite, with the following composition:—

|               |                 |
|---------------|-----------------|
| Cobalt .....  | 10.00%          |
| Nickel .....  | 8.16%           |
| Arsenic ..... | 68.72%          |
| Sulphur ..... | .42%            |
| Silver .....  | 8.7 oz. per ton |

On H. R. 21 there are several calcite veins and one of them has shown on development native silver. This vein is near the east side line and strikes about N.N.E. A shaft has been sunk to a depth of 40 feet. The gangue is calcite, which has a very fine cryptocrystalline texture, associated in bands with quartz and decomposed material. Leaf silver, in small flakes, has been found across the vein, associated with smaltite, copper pyrites and native bismuth. Minute crystals of chloanthite are scattered through the gangue.

On H. R. 16 (Haileybury Silver Mining Company) the original discoveries were smaltite and niccolite. A sample of the massive ore has the following composition:—

|               |        |
|---------------|--------|
| Cobalt .....  | 15.92% |
| Nickel .....  | 11.18% |
| Arsenic ..... | 60.38% |
| Silver .....  | trace  |

The vein has a strike of S. 20 E., and dips 70 to the east.

On this vein a shaft has been sunk to a depth of 100 feet, and about 15 tons of massive smaltite have been obtained. Only 17 feet of drifting have been done at this level. The chief vein filling is calcite and decomposed material.

Later a vein showing native silver was discovered on the south half of the claim. The silver is associated with smaltite. A shaft has been sunk on the vein to a depth of 75 feet. At this level drifting was carried 40 feet to the northeast and 40 feet to the southeast. The veins on this property are in the Keewatin.

On H. S. 42 (Forneri claim) there is a vein about 3 inches in width, with strike N. N. E., and occurring in the conglomerate. The vein material is smaltite and copper pyrites in calcite and quartz. A surface sample on assay showed no silver values. A shaft has been sunk to a depth of 75 feet. At 35 feet the vein dipped from the shaft. It is reported that silver values were obtained on assay at 14 feet depth.

On R. L. 471, near the east side line, there is a strong vein of massive smaltite, on which a shaft has been sunk 65 feet. The vein is in the Keewatin.

On H. R. 106, adjoining Trout lake on the northeast, a five by seven shaft has been sunk 50 feet on a calcite vein carrying smaltite.

On T. C. 73 there is a shaft down 40 feet on a calcite vein with disseminated smaltite and copper pyrites. These veins have not proved to carry appreciable silver values. The rock is the later diabase.

On H. R. 69 (Maiden claim) there has been extensive development work. Near the east side line, a tunnel has been driven from the base of a hill a distance of 206 feet on a calcite vein. At 100 feet a winze has been sunk to a depth of 60 feet. The vein in places has a width of 12 inches. Smaltite and niccolite are found in bunches in the vein. Low silver values are reported to have been obtained on assay. On vein No. 2 to the west a tunnel has been driven 176 feet. The vein filling is chiefly calcite with smaltite and niccolite in portions of the vein, 5 to 7 inches in width. The veins are in the Keewatin just north of the contact with the late diabase and strike a little east of north.

On H. R. 14, near the west side line, some native silver has been obtained in a narrow vein in the diabase.

On T. C. 71, east of Loon lake, a tunnel has been driven 100 feet on a strong calcite vein about a foot in width.

At other parts of this area there has been considerable prospecting, consisting of trenching and sinking of small pits and shafts. Calcite veins are the most common type, the calcite being usually associated with more or less quartz, and carrying smaltite and niccolite occasionally. These latter minerals have been found on a number of claims in well-defined veins.

Aplite dikes which are characteristic of many of the silver showings in the township of James and vicinity are of little importance in South Lorraine.



# LEAD SMELTING AND REFINING PRACTICE AT TRAIL, B.C.

By A. J. McNab.

The Trail Smelter was built by Mr. F. August Heinze in 1896, to treat Rossland copper-gold ores only. In 1898 it was acquired by the Canadian Smelting Works. The new management at once began enlarging the capacity of the plant, and in 1899 installed the lead smelting department. This, in accordance with the standard practice of the time, consisted of hand and Bruckner furnaces for roasting, and rectangular blast furnaces for reduction. The plant consisted of three blast furnaces, ten hand roasters and six Bruckners. At this time no refinery was built, the bullion being shipped to San Francisco, where it was refined in bond. In order to save the heavy freight and refining charges, it was decided to build a refinery, and, in 1902, after careful experiment, the Betts Electrolytic Process was installed, the capacity being ten tons. This was enlarged successively in the years 1904 and 1905 to 20 and 50, and in 1906 to 75 tons—its present capacity. During this time the main changes in the smelting department were the abolition in 1906 of the hand roasters and Bruckner furnaces and the installation of the Huntingdon and Heberlein roasting furnaces and converters, the first installation being two Huntingdon and Heberlein roasters and twelve converters. In 1907—1908, four more roasters and twelve more converters were added, and two additional roasters are now being built, making eight in all, with twenty-four converters.

The ore supply is obtained from all parts of the province, Trail being the only customs smelter; in fact the only lead smelter in operation in British Columbia at the present time. The main supply comes from the St. Eugene mine, East Kootenay, owned by the Consolidated Mining & Smelting Company. This mine supplies about 75 per cent of the total lead produced. The remaining 25 per cent is almost entirely derived from other mines in East Kootenay and the Slocan districts. The lead tonnage produced from other sections being a negligible factor.

The ores are mainly sulphide, 80 per cent, being heavy galena ore or concentrates, running from 45 per cent to 75 per cent, lead. The tonnage of oxidized lead ore is small, not being over 10 per cent, while the balance of the tonnage is dry gold and silver ores with some gold concentrates from stamp mills. This preponderance of heavy sulphide ores necessitates a marked difference in policy from that followed by other lead smelters on this continent, as the conditions outside this province usually furnish the reverse features, viz., a comparatively small tonnage of heavy galena ore and concentrates, and a large tonnage of dry ores, iron concentrates, etc. This, as will be noticed later, compels a high percentage of lead on the charge, 35 per cent—45 per cent, as against the common practice of 10 per cent—15 per cent.

**Sampling and Bedding:**—The oxidized lead and dry ores are sampled in a mill equipped with Vezin samplers crushing the sample to  $\frac{1}{4}$  and the reject to a 6 ring. This reject goes direct to the lead furnace charge bins. The heavy galena ores and coarse concentrates are crushed to  $\frac{1}{4}$  and bedded, the sample being taken with Vezin samplers as above,  $\frac{1}{500}$ th being the amount cut out. The fine concentrates are usually sampled by the fifth shovel method and bedded direct. In bedding it

is aimed to secure a mixture with about 50 per cent of lead, only ore being bedded; lime rock, lead matter and a small amount of the ore (which, with the beds, constitute the roaster charge) is added later. At one time it was the practice to add the necessary amount of time rock and matte to the beds; but on account of the beds freezing in winter, which rendered a uniform mixture impossible, the extra expense of handling, together with a want of elasticity, which rendered a sudden change in the charge difficult, it was abandoned. The beds are large flat bins with a capacity of from 600 to 700 tons and are provided with tracks, etc., to enable the ore to be spread out in layers of a uniform thickness, so that in smelting the bed a fairly constant mixture shall be obtained.

**Making up Charges, Mixing and Roasting:**—The charge for the H. and H. roasters requires to be made up with a certain content of lead, iron, silica and lime to work well in the roasters and converters, and later in the blast furnace. In fact, the roasting department is the most important part of a lead smelting works; and the experience here has been, that with a good roast there is little or no furnace trouble, whereas with a bad roast furnace complications are considerable. We find that for our usual conditions the most economical roast will analyze about as follows:—

Lead 40—44 per cent; tin 10—13 per cent; silica 8—11 per cent; lime 7—10 per cent; zinc under 10 per cent.

This material when properly mixed, roasted and converted will give a fairly hard, dense product of a yellow or grayish-yellow colour, showing considerable litharge, will make but little fines and will be fairly easily broken. It will run fast in the blast furnace with a cool top, clean slags and bright tuyères. We have found some difficulty in getting a good roast with over 45 per cent lead in the roaster charge, the sulphur being usually high; but we have not had occasion to try it since installing the mixer, and that might make some difference. The difficulty seemed to be that in places the charge would not be sufficiently stiff, the galena fusing before roasting much, and in the fused condition it is almost impossible to roast it. With a properly mixed charge this might not occur and several per cent more lead might be carried. We have never had occasion to run our lead lower than 38 per cent, over any lengthy period. This gives a good product if the other constituents are properly proportioned; in fact, a 38 per cent, is, we think, preferable to 42 per cent, as it runs a little faster and gives less trouble. If our ores were suitable, we would run about 38 per cent—40 per cent lead, as on the whole it would be little more satisfactory, being, for example more easily broken. But this difficulty is not so great that it would pay us to dilute our charge with ores carrying a low treatment rate. The iron ought at the least to be as high as the silica, and it is better to have it one or two per cent higher. We have been compelled at times to run our roast with from 2 per cent to 3 per cent and even 4 per cent higher silica than iron and we have always had trouble. It did not seem to interfere with the sulphur elimination at all, as that would be as good if not better than ever; but do as we would, the tonnage would fall.



off badly, the slags would get higher in lead and there was a great tendency for the heat to get up in the furnace. We varied the rest of the blast furnace charge in every way we could think of, carried our lime in the slags high and carried it low, tried the coke higher and lower, varied the amount of slag, changed the feeding and the blast but with no very decided improvement. But on changing the analyses of the roast, all our troubles would disappear in a short time. The only explanation that we can see is that the high silica roast was too fusible, fusing too high in the furnace, which would cause the bad reduction, hot top, and slow running. We have no data on the relative fusing temperatures of the two roasts, and consequently have no facts to base our assumption on, but it seems to be the only one to fit the results and one would imagine the higher silica roast would have a considerably lower melting point. This would be a rather interesting but a difficult point to determine on a small scale, as it would be hard to get the roast sufficiently uniform so that a small piece would accurately represent it. However, if a series of determinations on each kind were made, the average would probably be very near correct.

We run the lime between 7 per cent. and obtained 10 per cent. This, with our conditions, represents about the limits. We have never too good results with the lime below 7 per cent; as a rule we run it about 8 per cent to 9 per cent. However, if we had suitable ores to enable us to keep our iron up, that is to keep about the same total percentage of iron and lime, and keep the lead down to 42 per cent, it might work well. We have never had ores to enable us to try this, as we are somewhat short of iron and are compelled to use lime to keep our lead down. Another reason is that the product is difficult to break when the lime gets too low. We have never run the lime higher than 10 per cent; in fact, we always keep it as low as possible, because it is not economical, as we have to add most of our  $\text{CaO}$  as  $\text{CaCO}_3$ , which has to be charged with the cost of roasting.

The roaster charge is accurately figured and carefully weighed, being made up with bedded ores, lime rock, stamp mill concentrates and matte, from the furnace, that is too high in lead and too low in copper to be concentrated. This charge is put through a cylindrical mixer, one mixer handling the material for four furnaces. This discharges the material into an elevator, discharging into chutes which convey the material to the furnace feed hopper.

(To be continued.)

### EXCHANGES.

**Mines and Minerals, July, 1909.**—Birds in their little nests do quarrel sometimes. The Engineering and Mining Journal now believes that there is some connection between earthquakes and coal-mine explosions. Because Mines and Minerals did not believe, the E. and M. J. called it names. Mines and Minerals replies by classing E. and M. J., in point of modernity, with the horse cars that still survive in New York.

Both of our hot-headed contemporaries are old enough to know better. Apart from the waste of valuable space, this interchange of brickbats is exceedingly bad taste. Apologies are due from both belligerents.

**The Engineering and Mining Journal, July 3, 1909.**—"Speculation in Copper" is the title of the leading editorial in this issue.

The London Metal Exchange, which in effect is international, serves as a balance wheel, and the prices for copper at New York and London can never be for long out of joint.

Last year outside interests, having no direct concern with the metal industry, participated in copper speculation. The active movement of the copper market has attracted several classes of speculators. Thus a gambling spirit has been injected into the business in a staple commodity. This is deleterious. Speculation has kept up the price of copper at its present level. Production is not decreasing. Only an increased consumption can sustain the market.

**The Mining Journal, June 26, 1909.**—The report of a Royal Commission on the centralization of Departments of State in India took up the mining legislation that obtains there. The Mining Journal comments upon the report, and upon some of the statements submitted by witnesses. It appears that the Director of the Geological Survey of India defined the functions of his department as purely advisory. Under six heads he defines the duties that it performs: (a) The preparation of a general geological map of India; (b) the collection and dissemination of information about the mineral resources of the country; (c) the preparation of statistics of mineral production; (d) the control of a geological museum; (e) the teaching of geology in the Presidency College, Calcutta, and (f) the training of a limited number of prospectors and post-graduate students. The Director objects to taking under his wing the granting of mining concessions. He expresses frank distrust of his subordinates. The mining Journal indicates its astonishment at this surprising confession.

**The South African Mining Journal, June 5, 1909.**—Some pertinent remarks on present-day problems are made in this issue.

Absorption and amalgamation of properties on the Rand have brought about new problems. Small mines, equipped for small tonnages, require remodelling when they become component parts of large concerns. The East Rand Proprietary Mines Company is a case in point. Here several small mines were amalgamated under one management. Consequently its working costs are higher than for single large mines of similar total tonnage capacity.

One of the chief problems in operating a group of small properties is the arrangement of the shafts. These are often not capable of dealing with the increased tonnage which is usually the object of the consolidation of properties. Another problem is the sorting of ore from wide stopes that make a large amount of waste. Theoretically, 50 per cent. is the limit of hand-sorting. In practice about 15 per cent. is the average amount of surface sorting done, and 33 per cent. is the maximum. Thirty per cent. appears to be the highest amount that can be economically sorted. The results of the stope drill contest will modify this question.

**The Mining World, July 3, 1909.**—This Special Mexican Edition of our Chicago contemporary is filled with facts, figures, and descriptions of Mexican mining. In several of the editorials there is important information. Concerning the smelter situation in Mexico, it is noted that owing to the extended use of cyanide, a scarcity of siliceous ores for smelting is becoming pronounced. At Guanajuato the cyanidation of concentrates is being



tried out. The proposed nationalization of the smelters is not taken seriously by the Mining World.

There is no zinc smelter in the republic. The spelter used is imported, and pays a large duty, except when in the form of perforated sheets for use in cyanidation. There is no export duty on zinc ore, and when it contains less than 250 grams of silver per ton the export tax on silver is not assessed. Promising zinc ore deposits have been opened up in Jalisco, Sinaloa, and Sonora, tributary to Pacific ports, and available for the European market. Most of this is sulphide ore.

Thirty-seven Mexican mining companies to date have paid to shareholders \$58,307,432 in dividends, a return equivalent to 66 per cent. on their outstanding capitalization of \$89,100,662. By far the larger dividends are being distributed by corporations that are still doing business under the old Mexican custom of capitalizing at so many shares, not dollars, their par value depending upon the demand for the stock in the open market.

On the precious metals there is in Mexico a federal tax of 2 per cent. on the output. There is no federal export tax or direct tax on the base metals, but there are numerous fees and stamps, which are in effect a tax on the base metals exported. The states taxes vary, and include direct taxes on the gross output, percentage taxes on the salary and wage roll, and tonnage taxes on ore mined and ore treated. The stamp tax is ever present.

We could multiply interesting notes from this Mexican edition indefinitely. It is a creditable issue.

We notice with pain that in one editorial the word "data" is used as a singular noun.

## PERSONAL AND GENERAL.

Mr. L. B. Orchard has been appointed chemist to the Atikokan Iron Company, Port Arthur, Ont.

Messrs. R. E. Harris and Thomas Cantley, of the Nova Scotia Steel Company, sailed on June 25 for England.

Mr. Samuel Cohen, general manager of the Crown Reserve, Cobalt, recently underwent an operation in Montreal. He has recovered completely.

Dr. C. W. Dickson has resigned the position of assistant professor of chemistry at the School of Mining, Kingston, and is making arrangements to settle in British Columbia.

Mr. Martin Cohn, managing director of the German Development Company, has returned to Toronto from a visit to Quebec. Late in June Mr. Cohn made a record-breaking return trip to Europe.

Mr. P. N. Nissen, of Los Angeles, is to spend this summer in Ontario. Mr. Nissen is the inventor of the Nissen stamp mill. At the enormous mill of the Boston Consolidated 312 of these stamps are installed. Two trial stamps are to be placed in the mill of the Northern Customs Concentration Company, Cobalt.

Mr. William Maxwell has resigned his position as manager of the Dominion Coal Company's No. 12 mine, which he has held since the early stages of its development, and has taken a position in the Pincher Creek District, Alberta, where a new coal property is being opened up under the direction of Mr. Charles Fergie.

## SPECIAL CORRESPONDENCE

### NOVA SCOTIA.

**Glance Bay, July 5.—June Tonnages.**—The month of June was the briskest that has been seen around the collieries of Cape Breton for a long time past. The men have worked steadily, shipping has been regular, and outputs have in consequence been unusually large.

The mines of the Nova Scotia Steel Co. produced in the neighborhood of 78,000 tons which is some 7,000 tons more than the best preceding output, and is 21,000 tons greater than the output of June last year.

At Glance Bay likewise outputs were good. The mines of the Dominion Coal Company raised 355,000 tons, which is the largest June output ever obtained by that company, and the highest output on record, with the single exception of last July, when 368,000 tons were obtained. The outputs for the half year ending June 30th totalled 1,629,000 tons, showing a reduction of 300,000 tons in comparison with the corresponding period of 1908.

Some notable figures were made by the individual collieries. Dominion No. 1 had an output of 58,000 tons, which is the highest monthly production since the 1903 fire, and approaches the record of this mine before the fire. On one occasion during the month the daily output reached 2,600 tons, which is really an astonishing output from this old colliery.

Dominion No. 2 has 70,400 tons to its credit for the month, which establishes a new record for this mine. On several occasions during June the daily output was over 3,100 tons.

The Hub Colliery (Dominion No. 7) also made a very fine showing, raising 20,600 tons, this being the largest tonnage for a month that the Hub ever put out, in all its numerous vicissitudes.

Throughout the month the outputs showed a remarkable uniformity, practically unmarked by the fluctuations that occur after paydays. This was to some extent accounted for by the dates on which wages were paid, and also by the evident desire of the workmen to provide for possible trouble ahead.

The Nova Scotia Steel Company have now got their rescue station into operation, and gangs of men have been practising in the smoke-chamber. Mr. Robert Robson, a gentleman whose mining experience in Cape Breton reaches back to the days of the General Mining Association, is in charge of the station, and he spent several days at the rescue station at Glance Bay, in order to obtain hints from the experience which the Dominion Coal Company have had in this work. The equipment of the Nova Scotia comprises twelve of the latest model Draeger apparatus, and a corresponding number of the "Tankersley" electric hand-lamps. We think the N. S. S. Company are to be heartily commended for this addition to their equipment, and it is to be hoped that the example set by the two largest coal companies in the Dominion will be followed by others.

An interesting note is contained in one of the papers recently read before the American Institution of Mining Engineers, describing the operations of the Stag Canyon Fuel Company, whose mines are situated near Dawson City, New Mexico, from which it appears that the rescue station of this company is designed after that of the Dominion Coal Company at Glance Bay, with some few modifications. Dr. James Douglas is the president of this company, and judging from the description of the Stag Canyon Company's mine, he is to be congratulated on the provision that has been made for the safety of the workmen, and their personal comfort in such matters as housing and recreation.



The U. M. W. A. in Glace Bay now has its own newspaper organ, a weekly newspaper known as the "Standard." This paper in its first issue, with that characteristic modesty which distinguishes the U. M. W. A., stated that its mission in Glace Bay was to "raise the status of the local press." Some of the items we have noticed in the "Standard" do not, however, bear the impress of the fair-mindedness that we should expect from the editorial chair of a newspaper with such a sense of its high mission to the public. For example, in the last issue we read that the Dominion Coal Company are wantonly destroying two coal seams in their Glace Bay coal field by working the Phalen Seam. Above the Phalen Seam, at a distance of 115 feet, is to be found the Back Pit Seam, 2 feet 7 inches in thickness. Above the Back Pit at a further distance of 73 feet, is the Boutillier Seam, said to be 3 feet 9 inches thick. Separated from the Boutillier by 243 feet of strata is the Harbour Seam, 5 feet 6 inches thick. The "Standard" says that when pillars are drawn in the Phalen the roof falls up to the Back Pit, destroying the same. This is interesting information indeed. A "fall" 115 feet high would be an unhealthy place to work around. The "Standard" goes on to blame the deputy inspectors for dereliction of their duty in allowing this to go on, and the Government for alienating the "people's property" to a corporation that is so wicked as to destroy its own lease value. A little knowledge is a dangerous thing, and is apt to lead the eager newspaper scribe into mistatements of a particularly glaring kind.

The Royal Commission on Coal Supplies which sat some years ago in England and went thoroughly into every phase of coal mining, particularly investigated the effect on coal seams produced by the order in which they were worked, and their conclusions may be taken as the last word on this question, for the witnesses that gave evidence before the Commission were men whose knowledge of coal mining was beyond cavil. The witnesses were unanimous in one statement, namely, that the best seam was always worked first. They all agreed also that the order of working must be decided by the peculiarities of the district, but in general the best way was to take the lower seam first. The effect of working an upper seam was to "wind" or render lifeless the seam immediately below. In such a case it was necessary to decide which seam it would be more profitable to allow to suffer injury. In the Glace Bay coalfield the Back Pit Seam is not a seam that can be commercially worked in the present state of the coal trade, as it is thin, uncertain, and dirty. It was stated in the evidence before the Commission that if the distance between seams was over 100 feet there was no danger of the falls communicating from seam to seam, and that if a sufficient time is allowed to elapse after the exhaustion of the lower seam the upper seam can be mined without any appreciable loss, except a somewhat smaller proportion of round coal. In the case of the two inferior seams lying between the Harbour and Phalen Seams in the Glace Bay coalfield the Dominion Coal Company are following the most approved method of extracting coal seams where the strata contains several coal seams of varying value overlying one another. This method has been approved and passed upon by three at least of the most eminent mining engineers alive, under which circumstances the editorial criticisms of the "Standard" are not likely to carry much weight. We would not have noticed the paragraph but for the fact that many of the readers of the "Standard" may gather an erroneous idea, which should be corrected. It may not be out of place to enquire whether these same readers would prefer to draw pillars in the Phalen Seam, which is 8 feet 6 inches high, or in the Back Pit in 2 feet 7 inches of head room.

**U.M.W.A.-itis.**—After Mr. Tom Lewis's departure to his own country there was a hush in the U. M. W. A. campaign, but we are now given to understand that it was a "sultry hush," and but the prelude to Armageddon. For a year past the motto of the U. M. W. A. leaders in Cape Breton seems to have been that of the Spaniard, "manana," "to-morrow, to-morrow." Since

January there has been a rustling in the tops of the mulberry trees, and now we understand the day of reckoning is at hand. But we have heard this so often. The downfall of the coal barons was fixed for May 1st, a date beloved of the red flag, but something went wrong with the programme. Nothing has even yet been heard of what took place at the convention of May st. The public were then informed that President Lewis himself would visit Nova Scotia and teach the coal companies the egregious error of their ways. Mr. Lewis came, said a few honeyed words, and went. Now the U. M. W. A. clans have foregathered at Sydney, and are in session at the time of writing. They magnanimously invited the coal operators of Nova Scotia to meet them at Sydney and talk the matter over, saying that they, the U. M. W. A., wished to arrive at a satisfactory understanding. Unfortunately, the views of the coal operators and of the U. M. W. A. as to what constitutes a satisfactory understanding do not coincide, and never will. The ideal of the U. M. W. A. as preached to the listening faithful is said to be the simultaneous presence of the legs of a coal operator opposite and contiguous to the legs of a U. M. W. A. delegate, under the same table. However, that may be, the meeting of July 2nd, for which the invitations were issued, did not measure up to this ideal; the letter of the U. M. W. A. was most cordially ignored, and the coal owners were rude enough not even to notice the r.s.v.p.

The district president of the U. M. W. A. has now issued a statement to the press, in which he states that if the Dominion Coal Company do not agree to meet the Executive of the U. M. W. A. by 2 p.m. (Atlantic standard time), June 5th, A.D. 1909, the U. M. W. A. will call a strike on the following morning for higher wages, shorter hours, better conditions generally, and recognition. The Dominion Coal Company will not meet the U. M. W. A., will not recognize them, will not give shorter hours, higher wages, or alter any of the conditions of the present agreement with its workmen, arranged by a Board of Conciliation with the Provincial Workmen's Association, and effective until the end of 1909. So it is up to the U. M. W. A.

There is a law on the statute books of this Dominion known as the Industrial Disputes Act of 1907, and better known as the Lemieux Act, which states that no person shall strike for any change in wages or hours without giving 30 days' notice of his intention to do so, and reference to a Board of Investigation and Conciliation. This law is a sort of ratchet arrangement, and works one way only. At least that is how it looks to the casual observer. We do not remember to have seen its provisions and penalties carried out, although they have been violated times innumerable. It looks as if an opportunity would arrive for testing the impartiality of this law. What is sauce for the goose is sauce for the gander, and what applies to the Dominion Coal Company should also apply to the U. M. W. A. We shall see.

The U. M. W. A. at Springhill have served demands upon the Cumberland Coal Company of such a nature that we think the bare recitation of them will suffice.

First and foremost, the U. M. W. A. ask for "complete recognition, and collection of all dues and assessments through the colliery office." Riding rakes are to be put on half an hour earlier in the afternoon than has hitherto been the custom, and the "Managing Committee of the U. M. W. A. are to be allowed to ride out on the first rake." The list of rates demanded is much too long to quote even in part, but some idea of what it means may be conveyed by the following: Skilled shiftmen are to be paid \$3.05 per day, unskilled shiftmen in charge of gangs \$2.13, and all other unskilled labor \$1.83 per day. All overtime and Sundays to be paid at double-time rate. Any man called out in the night time or working out of his regular shift is to be paid double time. All miners out of places are to be paid wages equal to those which they would earn in places, and if for any reason the regulation wage is not made by a miner he is to be made up to that figure. All coal dropped on the roads or cleaned up in the general opera-



tions is to be credited to the checkweighman's tally, and go to help to pay his wages.

The above are but a few of the requests made to the Cumberland Coal Co. The actual document is a lengthy one, and with a modesty in keeping with their demands the U. M. W. A. have appended to the schedule of demands an agreement all ready drawn for signature, the place of signature of the officers of the Cumberland Coal Company being placed below those of the U. M. W. A.

This is typical of the generally inverted notions of the U. M. W. A., and we think the leaders of this movement must be afflicted with a severe form of either megalomania or megaloccephaly. They talk and act like characters in a Gilbert and Sullivan opera, and they have gasconaded and caracoled before a long-suffering public until their antics and vaporings have ceased even to be amusing, and people are getting most decidedly bored by these disturbers of the public weal.

In pleasant contrast to the rhodomontade of the U. M. W. A. is the attitude of the P. W. A. This organization has preserved a very discreet attitude during the agitation, so discreet, in fact, that its enemies and sometimes too-eager friends have mistaken it for pusillanimity. Mr. John Moffatt, the secretary of this union, now states that all the members of the P. W. A. will continue to work in the event of a strike. Resolutions to this effect were passed at a joint meeting from 13 lodges of the P. W. A., including men from the shipping piers, and the officers of the P. W. A. claim they were never more thoroughly organized. They say the agitation has weeded out the disaffected members and left behind men who can be trusted to stick together.

The Dominion Coal Company appears to have been selected by the U. M. W. A. as their main objective, and it is claimed the whole of the funds of the organization and all its power will be concentrated upon this one corporation. The other operators presumably have no objection to having the Dominion Coal Company set in the forefront of battle, but the fight is theirs also. The Dominion Coal Company will not be found unready, and they will afford all necessary protection to the men who continue at work. If the preparations that they have made savor too much of industrial warfare as it is in the United States, the public know who are to blame. The Dominion Coal Company have been incorporated sixteen years, and until the U. M. W. A. introduced itself they never had a colliery fence, or a police force, or a strike. All grievances have been discussed between the men and the officials of the company in a fair and friendly way, and the general manager of the company was always accessible as a court of appeal from the decisions of his subordinates through the medium of a committee. Are we to believe that the whole of this province groaned in darkness until the U. M. W. A. came to set them free?

If the U. M. W. A. strike, they will do so in face of the award of the Board of Conciliation which they themselves asked for, in face of the fact that the P. W. A. or the majority of the workmen will remain at work, with no grievances to adjust, except the withholding of recognition; and (if the International Board of the U. M. W. A. do as it is claimed they will do) will strike with the aid of money contributed by men whose prosperity depends to a large extent on the wresting of the Canadian market from our own miners, living under a foreign flag, and the agitation will be carried on by alien and professional "walking delegates" and men who have their own little axes to grind. The little group of men who for purely personal aggrandisement have played with fire may see a conflagration they cannot control, and those ease-loving gentlemen who have carelessly and grandiloquently sowed the wind may reap the whirlwind.

#### ONTARIO.

**Cobalt, July 3.**—A writ has been taken out against the directors of the Crown Reserve Mining Co. as trustees for a block of stock amounting to 231,143 shares, which was turned over to

the directors by the syndicate for the purpose of raising money to carry on the development work at the mine. The action is for the return of the stock to the original syndicate. Accrued dividends are also claimed. The plaintiffs are John Black, Percy Ross, R. W. Garth, A. G. Fowler Ross, W. A. MacKay, and Dr. Herbert Ross. In order to avoid the expenses of a suit, the syndicate is, however, willing to have the block of stock equally divided between its members and the shareholders of the Crown Reserve. This compromise the directors have refused to consider.

The sale of the 830 acres of the mining lands of the Gillies Limit was a fizzle, and the returns were very disappointing, considering the extremely high prices that have been offered at various times. The lack of success is not to be wondered at when the procedure adopted by the government is considered. For two years or more the limit has been prospected under the supervision of government engineers, and during that time no reports have been issued to the public. The short time that elapsed between the publication of the notices and the close of the sale, which was not sufficient to permit of proper prospecting, also had a tendency to make people suspicious. Another important factor has been the failure, so far, of the Provincial Mine. This property is located in the centre of the district that was to be sold. Only 283 acres were disposed of, and the price amounted to \$75,643. The following is a list of the successful tenders, giving the price and the amount of land: H. P. Glidden, for John McMartin, Cobalt, 26.7 acres, for \$10,250; F. M. Connell, Haileybury, 11.7 acres, for \$2,500; Geo. Pratt, Buffalo, N.Y., 18.3 acres, for \$11,000; J. H. Waldman, Toronto, two 20-acre lots, for \$2,025 each; S. D. Maddin, Toronto, 20 acres, for \$2,750, and 15.4 acres for \$2,500; Robt. McKay, Toronto, 19.5 acres, for \$10,500; Boyd Magee, Haileybury, 16 acres, for \$8,558; A. T. Budd, Toronto, 19.86 acres for \$2,500, 19.7 acres for \$2,500, and 20 acres for \$2,500; C. A. Phillips, Parry Sound, 19.8 acres, for \$5,500, and J. G. Ross, Montreal, 20.07 acres, for \$5,100.

Plans and specifications for a new concentrator for the Nova Scotia Mine have been completed, and the cost is estimated at \$100,000. Development at the mine is being pushed in a vigorous manner for the purpose of enlarging the ore reserves sufficiently to warrant its construction. At the present time No. 3 shaft is being remodelled. When finished, it will have two compartments, and will be used for hoisting only. A new hoist with a capacity of 1,000 feet is being installed at this working. The total amount of workings up to date in the mine is 7,000 feet. The lowest level is 240 feet from the surface, and at this depth on No. 2 vein a winze is being sunk. Drifting will commence on the vein as soon as it has reached a depth of 65 feet. When No. 3 shaft is completed the No. 1 vein will be developed. The veins of this mine are low-grade, but wide, and the ore is especially adapted for concentrating. On the lowest level the vein has a width of about 8 feet.

Mr. H. Southworth, formerly engineer for the O'Brien, has been appointed manager of the City of Cobalt, in place of Mr. B. Leason, who resigned a short time ago.

The Coniagas have started work clearing the ground preparatory to the erection of the addition to their mill.

The preliminary surveys for the continuation of the T. & W. O. Railway from Charlton to Gowganda have been completed to a point within five miles of the latter place. The Government engineers are at present making exhaustive inquiries to ascertain the amount of revenue that the road would be likely to produce. No reports have so far been given out, and it is not likely that any decision will be arrived at before the end of August. The estimated cost of the road, which would be about 48 miles long, is about \$2,000,000. The location surveys have already been completed as far as Elk Lake.

In the north cross-cut from the No. 2 shaft of the O'Brien, at the 150-foot level, the No. 3 vein of the La Rose was encountered.



At the point where the vein was cut it shows about seven inches of high-grade ore.

In a raise started from the drift at the 150-foot level of the Badger good values were struck. The vein, which previously had been lean, widened out into five inches of high-grade ore.

At the Kerr Lake Mine a new vein of high-grade silver ore has been discovered. It is claimed to be better than the famous Crown Reserve vein.

The O'Brien Mine will shortly commence to double their output of high-grade ore from the mine. The smelter at Deloro, which is also controlled by Mr. M. J. O'Brien, will also have its capacity doubled this summer.

One of the shafthouses of the Cobalt Lake Mine was destroyed by fire on June 21st.

At the Peterson Lake lease of the Kerry Mine a new vein was discovered recently. The find was made at the 125-foot level, about 80 feet from the shaft. Previous development had failed to show the presence of silver in this vein.

While cross-cutting at the 360-foot level of the Big Pete Mine in order to tap a vein located some time ago by the diamond drill, a new vein carrying high silver values was struck at a point about 40 feet distant from where they expect to encounter the other mine. The vein was found in the Huronian slates, underlying the diabase. The finding of these slates, in which the best values of the mine occur, has had an important bearing on the development of the surrounding properties. It is understood that later developments have shown the presence of Keewatin underlying the Huronian slates.

The plant of the Beaver, which was destroyed by fire some time ago, is being rebuilt. Operations will be undertaken on a much larger scale when the mine is in a position to furnish its own power.

The directors of the Silver Cross Mine have decided to increase the capital from \$500,000 to \$1,000,000, and the by-law has been passed allowing them to sell the issue at 10 cents per share. There was a good deal of opposition to the increased capital, and a very stormy meeting resulted.

It is understood that a new 6-inch vein carrying good values has been discovered on the 75-foot level of the Otisse. The wall rock is also said to be well mineralized.

The remainder of the 830 acres of the Gillies Limit mining lands which were unsold under the recent tenders will be again offered for public sale on July 13th.

The Union Pacific, which is operating a lease on Peterson Lake, will shortly install a small steam plant, consisting of a 6x8 hoist and a 25-horsepower boiler. Drills will not be used until the power companies have air ready for distribution. The shaft will be sunk to greater depth before cross-cutting of the vein is started.

At the Temiskaming a winze has been sunk 50 feet below the 250-foot level on No. 4 vein, and from the bottom a drift was driven to the vein. When the drift was in about 15 feet the vein widened to about 7 inches of high-grade ore. A cross-cut is also being driven from the bottom of the winze to tap No. 7 vein.

It is understood that the Trethewey will shortly commence sinking a shaft in the northeast corner of the property. The Temiskaming & Hudson Bay have been operating a drill in this section from the 150-foot level of their shaft for the Trethewey, and it is with these workings that the shaft will connect.

Mr. A. P. Seymour has resigned his position as manager of the Floyd Mine.

Formal application has been filed in the office of the Provincial Secretary at Toronto for permission to increase the capital of the Temiskaming & Hudson Bay Company to \$3,500,000.

The diamond drilling at the City of Cobalt Mine has been stopped, and it is understood that satisfactory results were

obtained. Drilling was started from the bottom of the shaft, and when a depth of about 550 feet from the surface was reached, the Keewatin, in which the hole was started, was found to give place to the diabase. The discovery of this rock underlying the Keewatin is of great importance.

Diamond drill cores have lately been the means of giving a great deal of information regarding the different formations. A short time ago the diamond drill that was working on the Foster located the Huronian slates underlying the Keewatin. As the drilling progressed, however, the Keewatin was found to come in again below the slates.

A new find has been made on the Rawhide property located near Miller Lake. The vein consists of aplite, carrying good silver values.

The Gifford Extension has made arrangements to buy air from the Ophir, and the pipe line is now being laid.

The buildings of the Badger Mine were almost totally destroyed by fire. They caught from the bush fires in the vicinity, which also menaced the buildings of several of the surrounding mines.

### BRITISH COLUMBIA.

**Rossland.**—The management of the Le Roi Mining Company have intimated that the company has been successful in the raising of money with which to carry out the plan of development work that it is deemed advisable to do in the Le Roi mine. One of the chief features of the work, that will very likely be started early in July, will be a thorough exploration of what is considered the richest and most likely part of the Le Roi ground, from the present bottom of the mine, the 1,650-foot level, to the 2,560-foot level. The preliminary part of this work will (if plans already discussed are used) be done with diamond drill, holes being put into the ore-bearing ground from the 1,650-foot level downward, at intervals of about 100 feet in depth and about 200 feet apart on the vein. Comparatively rich ore has been found on the 1,650-foot level of the Le Roi; it occurs, however, in lenticular deposits in ground that is badly broken up, so that a broad plan of exploration seems to be the most advisable and what would prove the most economical in the long run, as sinking, drifting, etc., is expensive in the hard diorite of this locality.

During the week ending June 19th the output of the Centre Star group climbed to the 4,350-ton mark, which is 500 or 600 tons over what that property has been averaging during the last few months. During the same week other properties of the Consolidated Company shipped ore to the company's smelter at Trail as follows: St. Eugene, 601 tons; Snowshoe, 3,880; while the last shipment from the Richmond-Eureka amounted to 202 tons.

The Le Roi 2, Ltd., maintains a steady weekly production of approximately 420 tons, and mills about 250 tons of second-class ore. Le Roi 2 ore is the best that is shipped from this camp in the way of copper ore, but there is a very narrow margin of profit in milling operations here. The Blue Bird sent out ten tons of hand-picked ore during the past week. This ore comes from the galena-bearing reef in the South Belt, and gives returns of nearly \$80 per ton when carefully selected.

The metallic production of the Trail smelter during May was \$300,000 of gold, silver, \$250,000; copper, \$65,000; lead, \$175,000; a total of \$790,000. The production of this plant for the present year will be a couple of million dollars more than during 1908.

**Boundary.**—Mr. P. F. Roosa, erstwhile receiver for the Dominion Copper Co., has been appointed manager of the New Dominion Copper Co., now that the new concern has taken over the recently acquired interests of the defunct corporation. It is thought the mines will be opened up again early in August. The



New Dominion Copper Co. starts off in pretty good form, and it is to be hoped that this venture will prove a profitable one to the men who have their capital in the enterprise.

A small force of men have been put to work clearing up about the Sunset mine, getting things ready for the resumption of work. There is some talk of work being taken up again at the Providence mine, Greenwood. Over 700 tons of high-grade ore was shipped from this property in 1907, while only 50 tons was taken out last year, the energy of the directors being mainly centered on the placing of the company's bond issue.

As the coal miners in the Alberta fields have rejected the agreement of the Arbitration Committee, there is still no hope of coke from Coleman, whence the B. C. Copper Co. derives its supply. It is stated that this company during the last month that it worked was able to lay its copper product down in New York City for a fraction of less than eight cents per pound. It is hardly to be expected, however, that this figure could be maintained month in and month out, particularly when all fixed charges have been included. The B. C. Copper and Granby Companies, however, are in a position to make copper nearly as cheaply as any copper mining company on the continent, with a few exceptions, where quarrying is extensively carried on. The ore bodies are quite large in the Boundary, so that thousands of tons of the low-grade ore can be broken at a time, and, once broken, it is handled as much as possible by gravity, automatic loading, electric underground railways, gigantic crushers, etc., while at the smelters the ore, coke, etc., are all handled by automatic or nearly automatic machinery.

The tramway on the Phoenix-Amalgamated has nearly been completed to the railway siding. As soon as things have been arranged at this mine the Consolidated Company intends to ship ore from it to the Trail smelter.

**Nelson.**—The Eva mine, at Camborne, has been bonded by Eastern capitalists. The mine is very well equipped with machinery for present needs, there being a modern air compressing and power plant on the ground, as well as a 10-stamp mill and concentrator. In the Eva mine there is a large tonnage of gold ore that runs on an average low-grade, although there are veins in the large lodes that carry good quantities of the precious metal. Work on the "glory hole" plan has been carried on at some of the big surface lodes with good results. The mill was put in four or five years ago, and was worked steadily up to twelve or fourteen months ago, when it was decided by the management to sell the property. During the time that the mill was operated about \$250,000 in gold was taken from the ore treated.

There is no doubt but that the Slocan lead-zinc district is a factor, and a not unimportant one, in the tariff war being waged at Washington, D.C. This has been more particularly evinced by the presence in this district during the past week of J. A. Ede, of the Illinois Zinc Company, who is studying the local situation. The general manager of this concern, Mr. T. F. Noon, is in the capital city fighting on the side of those who are against too much protection for the zinc industry. There are big bodies of

zinc ore (the Mammoth group on Arrow Lake, for instance) that the American zinc companies would buy and work if the tariff wall was taken down. This state of affairs may be to the best interests of Canadian capitalists, however, who are bound to work these big zinc mines when the Canadian market grows to a point that will warrant such action, which it is drawing nearer to from year to year.

An \$8,000 gold brick was realized at the clean-up made at the Nugget mill last week. This was the result of a twenty-day run.

The fifth annual report of the International Coal & Coke Co. shows that the net profits on the operations of the company for the past fiscal year were \$284,210. This company recently sold 200,000 shares of its treasury stock to Victoria men, the proceeds of which will go toward paying off the bonded indebtedness. The International Company is about as well equipped for the mining of coal and the manufacture of coke economically as any company in the Crow's Nest-Alberta field, and with continued good management will prove a moneymaker for those who have invested their capital in the enterprise.

The Highland mine at Ainsworth is under bond, and it is understood will be worked early this summer.

The president of the B. C. Mining & Development syndicate, Dr. G. A. Ullerick, of Chicago, is in the district looking over the property of the company, comprising six gold-copper claims on the St. Mary River. A meeting of the Board of Directors was held while Dr. Ullerick was here, the engineer's report on the claims was read, and plans for working the claims at an early date were discussed.

The Head-Martin coal lands, which adjoin the property of the International Coal & Coke Co., will soon be under active development, a company known as the Head Syndicate having been formed with a substantial capital, part of which is now available for the proposed work. Leslie Hill, of Nelson, has been appointed consulting engineer and manager.

**Vancouver.**—Recently the interests of the Stave Lake Power Co. were taken over by the Western Canada Power Co., a new five-million-dollar corporation, the management of which expect within eighteen months to be able to deliver all or any part of 30,000 electrical horsepower to the cities of Vancouver and New Westminster, that power to be derived from the force of Stave River. A crew of sixty men is now employed in the construction of dam and plant, but this force is to be immediately augmented in order that the work will be finished at the time that has been set for its completion.

Continued activity is the watchword of the Portland Canal Mining Co., of which Mr. C. H. Dickie, of Victoria, is president. The extension of two of the tunnels on the property is being prosecuted with all possible speed, and a new tunnel has been started toward the ore-bearing ground. The towers are nearly finished that will carry the aerial tramway, and the concentrator site has been cleared and the foundation built in. The work will be hurried as much as is possible, in order that shipments can be started early this fall.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Sydney.**—The Dominion Coal Company has made a formal demand upon the Dominion Iron & Steel Company for a readjustment of the price of coal.

The coal contract between the Dominion Coal Company and the Dominion Iron & Steel Company, which was made on October 20th, 1903, provides that coal should be supplied till June 30th, 1909, at the price of \$1.24 per ton.

The contract then provides that on and after June 30th, 1909,

either party may require a readjustment, and if no agreement can be arrived at between them, the prize shall be settled by arbitration.

The new price is to be determined by taking the average cost of mining and delivering the coal for the five years ending June 30th, 1904, and also for the five years ending June 30th, 1909, and as the average cost for the first period is to the average cost for the second period, so will \$1.24 per ton be to the new price for the period from June 30th, 1909, to June 30th, 1914.



It is understood that no arbitrators have yet been appointed, and that the arbitration proceedings will not be proceeded with until the return of President Plummer from England.

### QUEBEC.

It is understood that the capital of the new asbestos merger, the Black Lake Consolidated Asbestos Company, will be \$1,000,000 6 per cent. bonds, \$1,000,000 7 per cent. non-cumulative preferred stock, and \$3,000,000 common stock. The company will take over the Union Asbestos mines, Southwark mines, the controlling interest in the Imperial Asbestos Company, and the Black Lake Chrome & Asbestos Company—in all an acreage of 5,385.

### ONTARIO.

**Elk Lake.**—A 40-inch vein was cut at the Otisse mine on July 1st.

**Cobalt.**—The fire that visited Cobalt on July 2nd did not do as much damage as currently reported. One thing is to be placed to its credit—it gave the town an opportunity of building regularly; \$350,000 will more than cover the entire loss.

**Dryden.**—The Northern Pyrites Co., operating on the shores of Vermilion Lake, near Lake Superior Junction, is about to commence shipping ore.

**Fort William.**—Several former Cobalt men, including N. G. Trethewey, have passed through Fort William on their way to the Sturgeon Lake gold fields. The Grand Trunk Pacific has now a direct train service from Fort William to Sturgeon Lake. On the lake, steamer connection may be had to any point on the shore.

**Port Arthur.**—The Atikokan blast furnace will very soon be blown in. A successful campaign will do much for the town. Mr. J. Dix Fraser, general manager, is a most competent man.

### BRITISH COLUMBIA.

**Vancouver, June 28.**—Greenwood Miners' Union, No. 22, Western Federation of Miners, has declared a strike against the mines and smelter of the British Columbia Copper Co. for the recognition of Greenwood Miners' Union. This is the substance of the circular issued by the Greenwood union. The manager of the British Columbia Copper Co. states that he has received no notification of the strike. The company is not operating at present through lack of coke.

**Rossland.**—The results obtained recently from the workings of the Blue Bird and the Hattie Brown mines in the South Belt are most favourable. The lessees of the Blue Bird took a car-load of ore out of the new ledge that netted them \$2,400.

**Fernie.**—The Crow's Nest Pass Coal Company has just completed the construction work on a new steel tippie at its mines at Michel, B.C., with a capacity of 1,000 tons of coal per hour. This is probably the largest single tippie on the continent.

**Rossland.**—J. L. Warner, F. M. Black and Dr. F. E. Morrison made the third payment, of \$13,500, on the Kootenay Belle mine at Sheep Creek, owned by Thomas Bennett and H. M. Billings. During the past week the mill returns have averaged \$160 per day.

During the past week an important strike was made on the Golden Belle at Sheep Creek. Two ledges had previously been laid bare and had shown excellent shipping and milling values. A third ledge was, however, discovered, showing about 11 inches of \$100 ore and about 12 inches of \$40 milling ore.

A rich discovery was also reported on the Gold Note, near Eagle Creek, and some magnificent samples of free milling quartz were brought in to the city. The specimens shown were joined together by threads and small veins of pure gold.

It was announced that the reorganized Dominion Copper Company at Greenwood intend to open up their properties in August.

Rossland shareholders in the Le Roi mine have received a circular in which it is stated that the necessary arrangements have been made whereby an extensive scheme of development may be carried on, and that work in connection therewith will commence without delay.

## MINING NEWS OF THE WORLD.

### GREAT BRITAIN.

Ninety-three per cent. of the Scotch coal masters have agreed to stand together for the reduction of the men's wages, and in opposition to a recognized minimum wage of 6s. per day.

The Prince and Princess of Wales on June 11th visited the Phoenix mine, six miles from Liskeard. Here the Prince christened a new shaft, and the Princess started a new pumping engine named after herself. After putting on mining attire, their Royal Highnesses went underground, where they inspected the tin lode and watched the miners at work.

### MEXICO.

One of the most remarkable oil wells ever known probably is that at Dos Bocas, in the northern part of the State of Vera Cruz. The well has been remarkable, not only on account of the fierce conflagration which consumed several million barrels of oil, but also on account of the tremendous force of the flow and the enormous output. Since the extinguishing of the fire the paramount problem has been to control the flow and save the oil. Immense earthen reservoirs and dykes have been built, but the oil has overflowed these and spread over the lagoons for a distance of several miles. In addition to this discouraging predicament, men and animals have succumbed to the effects of the

noxious gases which are constantly being thrown off by the well in great quantities. The company owning the well have worked incessantly and persistently, and now have it under control.

One of the effects of the development in the oil districts of Mexico has been that petroleum has come into use as a substitute for coal as fuel. Formerly the Mexican railways consumed from 120,000 to 140,000 tons of patent fuel drawn from Cardiff and district, but during the latter half of 1908 they converted 50 per cent. of their engines to oil-burners, and so satisfactory and economical has the result been that it is only a matter of the erection of the necessary storage tanks for the use of coal as fuel to be given up altogether. Many industrial enterprises which were formerly coal consumers have changed, and still others are now changing, their boilers in order to use oil. This has affected the importation of coal and patent fuel from the United Kingdom and elsewhere to the extent of causing a decrease in imports of about 40 per cent. during 1908.

### UNITED STATES.

At the experimental plant of the Fink smelter at Salt Lake City a 90 per cent. copper product was made. Later, in the same furnace, blister copper was made.

The retention of unmanufactured asbestos upon the free list is an acknowledgment by Washington legislators that Canada

has other special resources required by American industrial centres. It would be more to the purpose now if the manufacturers of asbestos were also relieved of the 25 per cent. ad valorem imposition, since the action of the Senate is an admission that the Canadian product is an essential.

The 25 per cent. penalty is having the effect of inducing those in the pro-British Continental trade to locate factories in Canada, and the concession made in the tariff bill will enable these to "catch 'em going and coming," as it were. The trend of affairs in the asbestos industry is toward milling stock. If the States will take "the cotton" in increasing quantities, and the first and second crude remain at present prices, the Quebec mines will assume greater importance.

#### CHINA.

The draft agreement with regard to the Anhui mining concession granted to Sir John Lister Kaye on behalf of the London and China Syndicate, Ltd., has been completed, but has not yet been approved by the Chinese Central Government. It necessitates the issuing of 160,000 £1 deferred shares of the An Yu (Yangtze) Concession Company, Ltd., at par, for Chinese subscription. These shares are now being offered to the leading merchants in the Anhui Province. The main idea of the agreement is Anglo-Chinese co-operation in the development of the Tung Kwan Shan mines, with British control of the finance. Hopes of an early settlement are entertained.

#### AUSTRALIA.

The first shipment of refined copper from New South Wales was made in May by the Electrolytic Company from Port Kemble. It consisted of 280 tons of copper wire bars.

At the Great Boulder Perseverance mine, Kalgoorlie, West Australia, telluride gold ores were discovered last October at a depth of 1,750 feet. The ore at that level assayed 100 dwts. per ton. A winze sunk to a further depth of 116 feet showed up ore carrying 42 dwts. per ton. This winze is to be sunk to the

1,900-foot level. At this depth there is 6 feet of ore in the drift assaying 8 dwts. per ton.

The Great Fingall Consolidated, Western Australia, has done away with its old filter system for treating slimes, and has installed a vacuum process. The new plant treats 10,000 tons per month, with 2 shillings profit per ton.

The shrinkage of 4,600 in the number of native mine labourers during May is explained as being always a concomitant of cold weather. Recruiting in Central Africa is progressing rapidly.

#### SOUTH AFRICA.

The Transvaal Government has agreed to issue 3,000 passes to enable the mining industry to enlist natives from the Central African Protectorate for work on the mines.

The developments on Waterbury tin prospects are most encouraging. In the Lydenburg district the sandstone reefs are opening up well on many properties.

Eight monitors will be working by September in the Swaziland tin fields. The deposits worked give a return of 15 per cent. metallic tin.

#### SOUTH AFRICA.

The East Rand Gold and Coal Estate have located the reef in their fresh borings on the farm Vischnil, adjoining one of the East Rand Mining Estates.

The commission appointed to inquire into the various electrical power schemes in their relation to Rand mining is now sitting. One witness stated that the utilization of electric power on the City Deep would result in a saving of £124,000 per annum. No new power scheme will be authorized until the commission has reported.

Further substantial tin discoveries have been made in the Waterberg district.

The June gold output, allowances being made for the transferred reserves appearing in the December figure, actually constitute a record.

## COMPANY NOTES.

#### BUFFALO MINES SURPLUS.

The Buffalo Mines, Limited, reports for the year ending April 30, 1909:—

|                    |           |
|--------------------|-----------|
| Total income ..... | \$479,483 |
| Expenses .....     | 275,193   |
| Surplus .....      | \$204,290 |

The general balance sheet shows a profit and loss credit of \$183,834, out of which was declared a dividend of 3 per cent., payable May 5 last.

The statement of operations for the first complete year of the new La Rose Company's existence, from June 1st, 1908, to May 31st, 1909, has just been issued.

The statement shows that the net operating profit is equivalent to 19½ per cent. on the outstanding capital prior to the distribution of the Lawson stock. The amount of ore taken out has been practically replaced by the addition of ore reserves in the main and other veins of the La Rose proper. With the transfer of the Lawson mine the whole of the company's capital of \$7,500,000 is now practically all issued, with the exception of a few shares not yet taken up by University holders.

The following are the official figures for the fiscal period:—

| Shipments.                                        | Tons.    | Oz. silver.  | Net value.<br>at mine. |
|---------------------------------------------------|----------|--------------|------------------------|
| June-December, 1908 .....                         | 325,777  | 1,498,592    | \$671,286              |
| January, 1909 .....                               | 58,145   | 291,349      | 132,598                |
| February, 1909 .....                              | 50,280   | 220,938      | 99,237                 |
| March, 1909 .....                                 | 49,281   | 131,345      | 55,188                 |
| April, 1909 .....                                 | 64,984   | 309,944      | 137,128                |
| May, 1909 .....                                   | 56,956   | 496,004      | 226,043                |
| Total shipments .....                             | 6,054.23 | 2,948,172    | \$1,321,480            |
| On hand May 31, 1909.....                         | 109,198  | 89,657       | 42,892                 |
| Total production .....                            | 6,163.43 | 3,037,829    | \$1,364,372            |
| Sundry income (interest and ground rentals) ..... |          |              | 1,518                  |
|                                                   |          |              | \$1,575,497            |
| Marketing expenses .....                          |          | \$203,231.19 |                        |
| Concentrating .....                               |          | 6,375.20     |                        |
| Operating expenses at mine .....                  |          | 272,318.67   |                        |
|                                                   |          |              | 481,925                |
| Net operation profit for one year .....           |          |              | \$1,093,572            |
| Construction accounts .....                       |          |              | 23,574                 |



The Temiskaming & Hudson Bay Company, of Cobalt, has declared a dividend of \$3 a share, or 300 per cent., on the capital issued.

Up to date the company has distributed 13,600 per cent. in dividends, the payment being as follows:—

| Date.                 | P.C.   | Amount.   |
|-----------------------|--------|-----------|
| November, 1906 .....  | 200    | \$15,552  |
| October, 1906 .....   | 2,500  | 94,025    |
| November, 1906 .....  | 6,500  | 504,465   |
| July, 1907 .....      | 300    | 23,283    |
| February, 1908 .....  | 200    | 15,522    |
| March, 1908 .....     | 200    | 15,522    |
| June, 1908 .....      | 400    | 31,044    |
| July, 1908 .....      | 600    | 46,566    |
| August, 1908 .....    | 1,200  | 93,132    |
| September, 1908 ..... | 300    | 23,283    |
| November, 1908 .....  | 300    | 23,283    |
| December, 1908 .....  | 300    | 23,283    |
| February, 1909 .....  | 300    | 23,283    |
| June, 1909 .....      | 300    | 23,283    |
| Total . . . . .       | 13,600 | \$955,526 |

The annual report of the Buffalo Mines, Limited, shows a production of approximately 1,000,000 ounces of silver marketed during the past year, a very creditable showing, particularly in view of the fact that for the first half of the year the policy of the management was one of simply maintaining the former dividend of 12 per cent. per annum.

During the last half of the year the policy was changed to one of heavier production following the increase in the dividend rate. The production of the last year added to that of the two

preceding years will total about 3,000,000 ounces of silver shipped to date. The management have decided upon a production of 2,000,000 ounces during the next year, which will mean doubling the rate of production of the three past years.

The Buffalo mine was among the first to begin the installation of a concentrating mill to treat the low-grade ores. As experiments had to be made, time was required in the installation first and in experimenting afterwards, but their untiring efforts were rewarded at last. The mill is treating at present upwards of 100 tons per day. The annual report shows that the mill has been saving 86.4 per cent. of the values. The mill rock averaged 43 ounces silver, the concentrates 1,500 ounces silver, and the high-grade ore 3,000 ounces silver. Nothing but high-grade ore and concentrates is being shipped, and a large saving is being effected over the old method of shipping all grades.

During the present month a crushing plant will be installed at a depth of 75 feet in No. 6 shaft for the purpose of adding to the capacity of the plant. By this means the crushing facilities will be doubled and the mill rock will be all the more easily handled after being hoisted. A complete cyanide plant has been installed, and will be started this month.

A new feature about the Buffalo Company, and one most commendable, is a decision to issue a monthly report to the stockholders. This will be sent out about the middle of each month covering the operations of the past month, and will embrace among other details the cost of operating, number of men employed, work accomplished in each department, number of tons of ore hoisted, amount of high-grade shipped, concentrates shipped, and the value of the shipments. The mill report will include the number of days the mill ran, quantity of ore milled, total ounces of silver recovered, and the mine report will show the number of tons of ore broken and the quantity of high-grade and mill ore blocked out.

## STATISTICS AND RETURNS.

The Dominion Coal Company's output for June, 1909, shows a gain of 10,000 tons over same month last year, and a gain of 6,359 tons over May, 1909. The following comparative table shows the last six months' production:—

|                            | 1909.     | 1908.     |
|----------------------------|-----------|-----------|
| January .....              | 195,971   | 312,358   |
| February .....             | 206,970   | 283,358   |
| March .....                | 251,585   | 344,129   |
| April .....                | 241,934   | 303,249   |
| May .....                  | 316,888   | 335,829   |
| June .....                 | 353,247   | 343,313   |
| Total for six months ..... | 1,616,705 | 1,922,236 |

The output of the Dominion Iron and Steel plant for June was largest yet reached, and new high records were made at last furnaces, open hearth, blooming, and rod mills. The principal items of production are:—

|                                      |              |
|--------------------------------------|--------------|
| Pig iron .....                       | 24,260 tons  |
| Steel ingots .....                   | 28,142 tons  |
| Rails .....                          | 18,419 tons  |
| Wire rods .....                      | 7,402 tons   |
| Shipments for month aggregated ..... | 27,000 tons. |

Shipments from the collieries of the Cumberland Railway & Coal Company, Springhill, N.S., for June were 25,801 tons.

### COBALT ORE SHIPMENTS.

Following are the weekly shipments from the Cobalt camp, and those from Jan. 1, 1909, to date:—

|                            | July 3.<br>Ore in lbs. | Since<br>Jan. 1.<br>Ore in lbs. |
|----------------------------|------------------------|---------------------------------|
| Buffalo .....              | .....                  | 613,777                         |
| Chambers-Ferland .....     | 60,000                 | 719,440                         |
| City of Cobalt .....       | .....                  | 874,522                         |
| Cobalt Central .....       | 35,901                 | 398,924                         |
| Coniagas .....             | .....                  | 807,005                         |
| Crown Reserve .....        | 51,380                 | 2,950,664                       |
| Drummond .....             | 480,000                | 920,000                         |
| Kerr Lake .....            | 124,103                | 1,115,261                       |
| King Edward .....          | .....                  | 141,180                         |
| La Rose .....              | .....                  | 6,519,933                       |
| McKinley-Darragh .....     | .....                  | 935,786                         |
| Nipissing .....            | 540,896                | 7,037,001                       |
| Nova Scotia .....          | .....                  | 480,810                         |
| Nancy Helen .....          | .....                  | 83,400                          |
| Peterson Lake .....        | .....                  | 200,540                         |
| O'Brien .....              | 127,697                | 1,226,654                       |
| Right of Way .....         | 138,527                | 1,909,361                       |
| Silver Queen .....         | .....                  | 255,335                         |
| Temiskaming .....          | 120,000                | 1,344,860                       |
| Trethewey .....            | 130,000                | 1,167,838                       |
| T. & H. B. ....            | .....                  | 918,260                         |
| Muggley Consolidated ..... | .....                  | 72,900                          |

Ore shipments to July 3, 1909, from Jan. 1, are 30,693,451 lbs., or 15,346 tons. Total shipments for week ending July 3 are 2,032,653 lbs., or 1,016 tons.

**COBALT ORE SHIPMENTS.**

Heavy shipments by the Nipissing last week put that mine ahead of the La Rose for the first time this year as the leading shipper of the Cobalt camp, and also helped to swell the total of the camp's shipments to 1,429,708 pounds of ore for the week, 714 tons, a record.

Shipments for the year to date total 28,433,203 pounds of ore, or 14,216 tons, nearly double the output in the same time last year, when shipments aggregated 17,358,338 pounds, or 8,676 tons.

|                                | Week ending<br>June 26. | Year.<br>to date. |
|--------------------------------|-------------------------|-------------------|
| Buffalo . . . . .              | 46,153                  | 613,557           |
| Crown Reserve . . . . .        | 134,725                 | 2,809,266         |
| Coniagas . . . . .             |                         | 842,630           |
| Cobalt Central . . . . .       |                         | 465,165           |
| Chambers-Ferland . . . . .     |                         | 659,440           |
| City of Cobalt . . . . .       |                         | 865,522           |
| Drummond . . . . .             | 240,000                 | 440,000           |
| Kerr Lake . . . . .            | 61,600                  | 987,028           |
| King Edward . . . . .          |                         | 97,050            |
| La Rose . . . . .              | 139,367                 | 6,196,304         |
| McKinley . . . . .             | 51,364                  | 935,686           |
| Nipissing . . . . .            | 453,135                 | 6,406,075         |
| Nancy Helen . . . . .          |                         | 83,400            |
| O'Brien . . . . .              | 188,891                 | 1,099,051         |
| Peterson Lake . . . . .        |                         | 200,540           |
| Right of Way . . . . .         | 61,363                  | 716,120           |
| Silver Queen . . . . .         |                         | 255,275           |
| Temiskaming . . . . .          |                         | 1,224,960         |
| Trethewey . . . . .            |                         | 1,032,838         |
| T. & H. B. . . . .             | 63,000                  | 918,080           |
| Muggley Consolidated . . . . . |                         | 72,900            |

**B. C. ORE SHIPMENTS.**

The shipments for the week ended June 26 were several thousand tons above the average for the year. The following are the ore shipments for the week and year to date:—

**Boundary Shipments.**

|                 |        |         |
|-----------------|--------|---------|
| Total . . . . . | 22,284 | 531,858 |
|-----------------|--------|---------|

**Rossland Shipments.**

|                 |       |         |
|-----------------|-------|---------|
| Total . . . . . | 5,012 | 116,013 |
|-----------------|-------|---------|

**Slocan Kootenay Shipments.**

|                 |       |        |
|-----------------|-------|--------|
| Total . . . . . | 3,838 | 90,338 |
|-----------------|-------|--------|

Total shipments for the past week were 31,134 tons and for the year to date 738,209 tons.

**Granby Smelter Receipts.****Grand Forks, B.C.**

|                 |        |         |
|-----------------|--------|---------|
| Total . . . . . | 19,760 | 464,608 |
|-----------------|--------|---------|

**Consolidated Co.'s Receipts.****Trail, B.C.**

|                 |       |         |
|-----------------|-------|---------|
| Total . . . . . | 8,259 | 178,037 |
|-----------------|-------|---------|

The total smelter receipts for the past week were 28,019 tons and for the year to date 794,428 tons.

Gold output of the Transvaal mines last month, as estimated by Kaffir houses in London, was 610,000 ounces fine. This estimate indicates a falling off in output from that of May of 14,500 ounces—owing, likely enough, to one day less of operations. Comparison of values is as follows:—

|                          |              |                      |              |
|--------------------------|--------------|----------------------|--------------|
| June, 1909 . . . . .     | \$12,962,000 | June, 1908 . . . . . | \$12,212,000 |
| May, 1909 . . . . .      | 13,263,000   | June, 1907 . . . . . | 10,780,000   |
| April, 1909 . . . . .    | 12,894,000   | June, 1906 . . . . . | 10,709,000   |
| March, 1909 . . . . .    | 12,903,000   | June, 1905 . . . . . | 8,757,000    |
| February, 1909 . . . . . | 12,004,000   | June, 1904 . . . . . | 6,546,000    |

The total output of gold from Rhodesia for the month of May is cabled at 53,467 ozs. valued at £225,032, as against 52,906 ozs. valued at £222,700, in the previous month. This is an increase on the month of £2,332. There were 230 gold producers last month. The output of other minerals for last month was: Silver, 22,116 ozs.; lead, 81 tons; coal, 14,420 tons; copper, 11 tons; chrome ore, 623 tons; asbestos, 33 tons.

**TORONTO MARKETS.**

**Metals, July 8.**—Quotations from Canada Metal Co., Toronto. These prices are slightly higher than wholesale prices obtainable on large orders.

Spelter, 5½ to 5¾ cents per lb.

Lead, 3½ cents per lb.

Antimony, 8½ cents per lb.

Tin, 31 cents per lb.

**Copper—**

Casting, 13¾ cents per lb.

Electrolytic, 13¾ cents per lb.

**Ingot Brass**—10 to 14 cents per lb.

**Pig Iron—July 8.**—(Quotations from Drummond, McCall & Co.)

Summerlee, No. 1, \$22.25 (f.o.b. Toronto).

Summerlee, No. 2, \$21.75 (f.o.b. Toronto).

Midland, No. 1, \$17.75 to \$18.00 (f.o.b. Toronto).

Pig iron prices are stiffening.

**Coal—**

Anthracite, \$5.50 to \$6.75.

Bituminous, \$3.50 to \$4.50 for 1¼ inch lump.

**MARKET REPORTS.****Coke.**

July 8.—Connellsville coke, f.o.b. ovens—

Furnace coke, prompt, \$1.50 to \$1.60 per ton.

Foundry coke, prompt, \$1.80 to \$1.90 per ton.

**Metals.**

July 8.—Tin, straits, 29.125 cents.

Copper, prime lake, 13.40 to 13.50 cents.

Electrolytic copper, 13 to 13.10 cents.

Copper wire, 15 cents.

Lead, 4.35 cents.

Spelter, 5.45 cents.

Sheet zinc, 7.50 cents.

Antimony, Cookson's, 8.375 cents.

Aluminium, 21 to 24 cents.

Nickel, 40 to 47 cents.

Platinum, \$22.50 to \$23.50 per oz.

Bismuth, \$1.75 per lb.

Quicksilver, \$44.50 to \$45 per 75 lb. flask.

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|                   | New York.<br>Cents. | London.<br>Pence. |
|-------------------|---------------------|-------------------|
| June 19 . . . . . | 52¾                 | 24½               |
| " 21 . . . . .    | 52¼                 | 24 1-16           |
| " 22 . . . . .    | 52⅝                 | 24 3-16           |
| " 23 . . . . .    | 52½                 | 24½               |
| " 24 . . . . .    | 52½                 | 24½               |
| " 25 . . . . .    | 52¼                 | 24 1-16           |
| " 26 . . . . .    | 52½                 | 24                |
| " 28 . . . . .    | 52⅝                 | 24 1-16           |
| " 29 . . . . .    | 52                  | 23 15-16          |
| " 30 . . . . .    | 52¾                 | 24                |
| July 1 . . . . .  | 51⅞                 | 23⅞               |
| " 2 . . . . .     | 51⅞                 | 23⅞               |
| " 3 . . . . .     | 51¾                 | 23 3-16           |
| " 5 . . . . .     |                     | 23 11-16          |
| " 6 . . . . .     | 51⅞                 | 23⅞               |

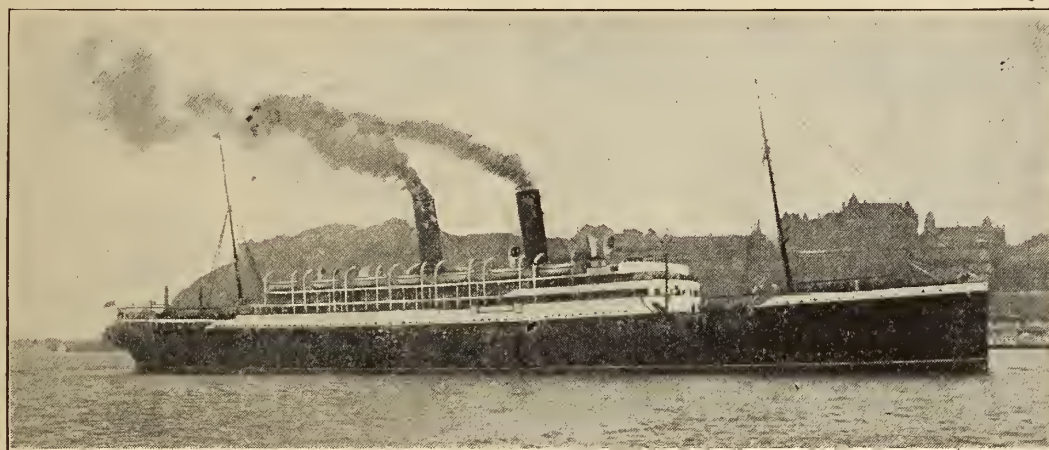


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NOTE.—Maps recently published may be had on linen cloth for use in the field at the price of 10c. per copy.

**REPORTS**

1072. Summary Report of the Operations of the Geological Survey for year 1908.

The Geological Survey, under certain limitations, will give information and advice upon subjects relating to general and economic geology. Mineral specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

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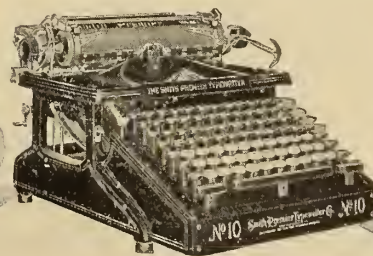
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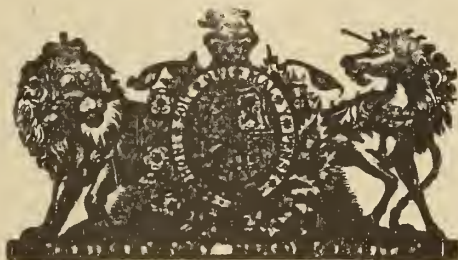
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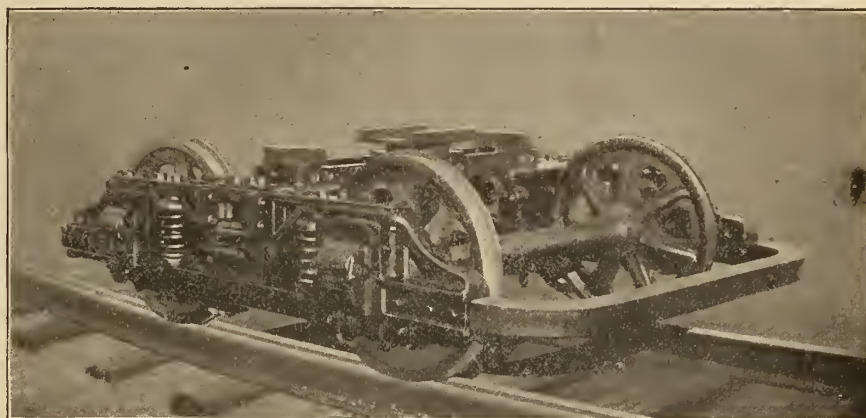
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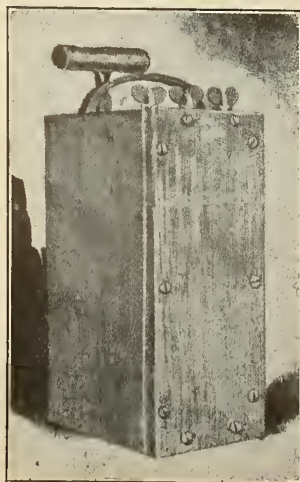
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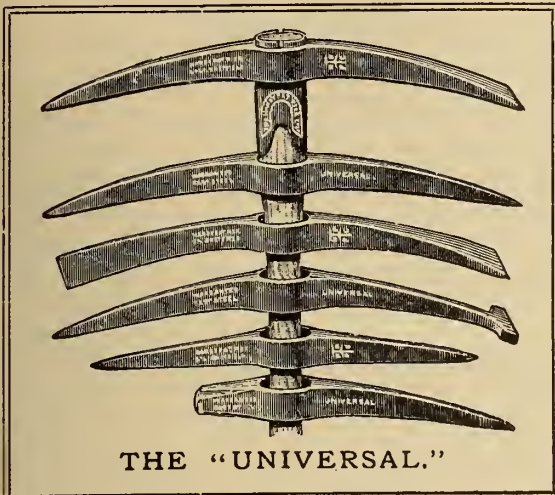
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30 days' trial, so you can

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in your own mine,—or better still, buy one machine and  
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### **A 5 Electric Rotary Drill**

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This machine can be absolutely depended upon to drill any material which can be penetrated by an auger bit.

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### **THE COST OF MAINTENANCE**

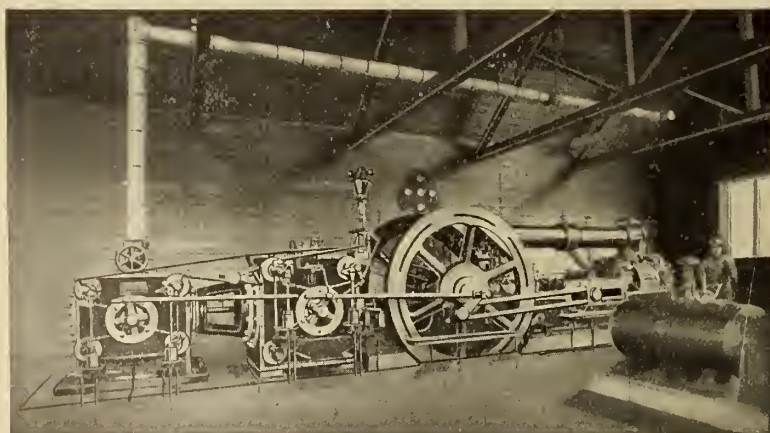
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**We build Complete Coal Mine Equipments**

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It unites low steam economy with high air and efficiency, thorough workmanship, and low cost for freight and foundations.

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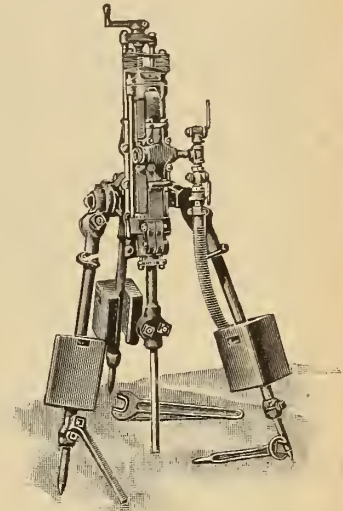


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Carried in Stock at Toronto  
Both New and Second Hand  
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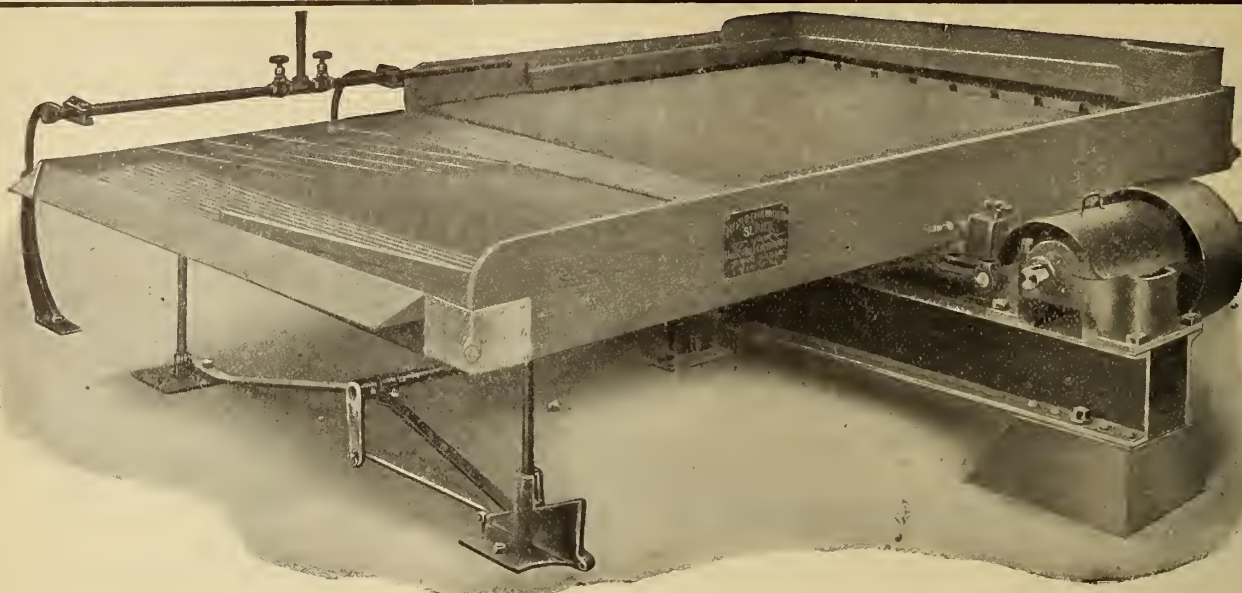
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Neg. Minera "El Carboncillo y Anexas, S. A.," Zacualpam, Mexico. Yours truly, (Signed) A. C. Chabaud, Mgr.

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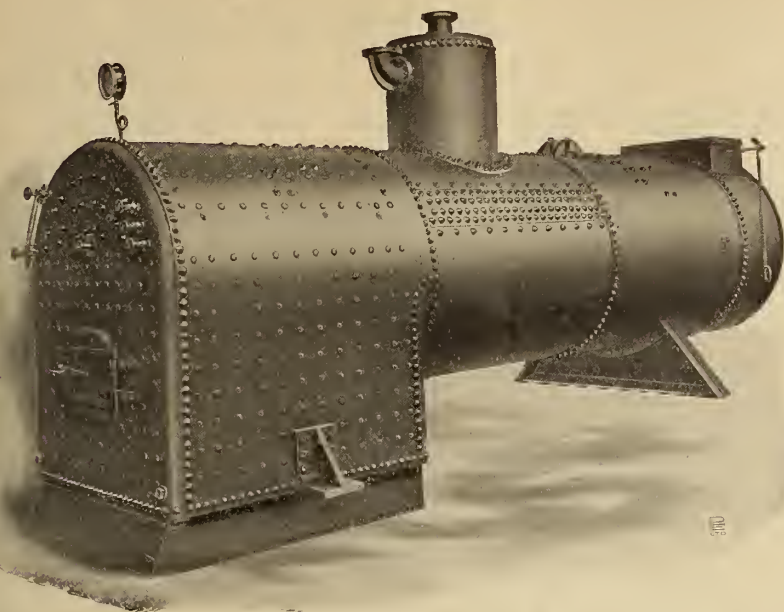
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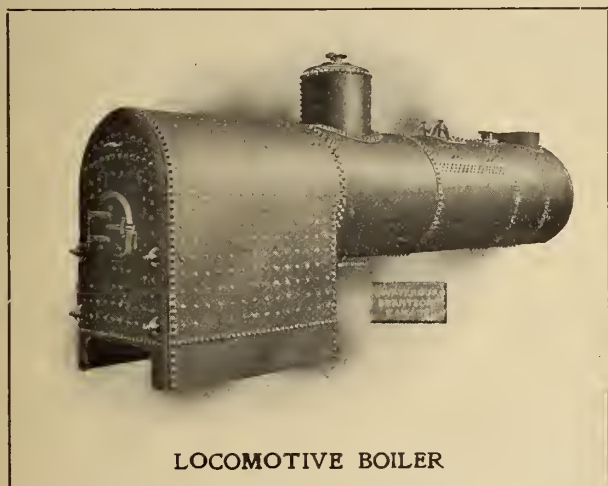
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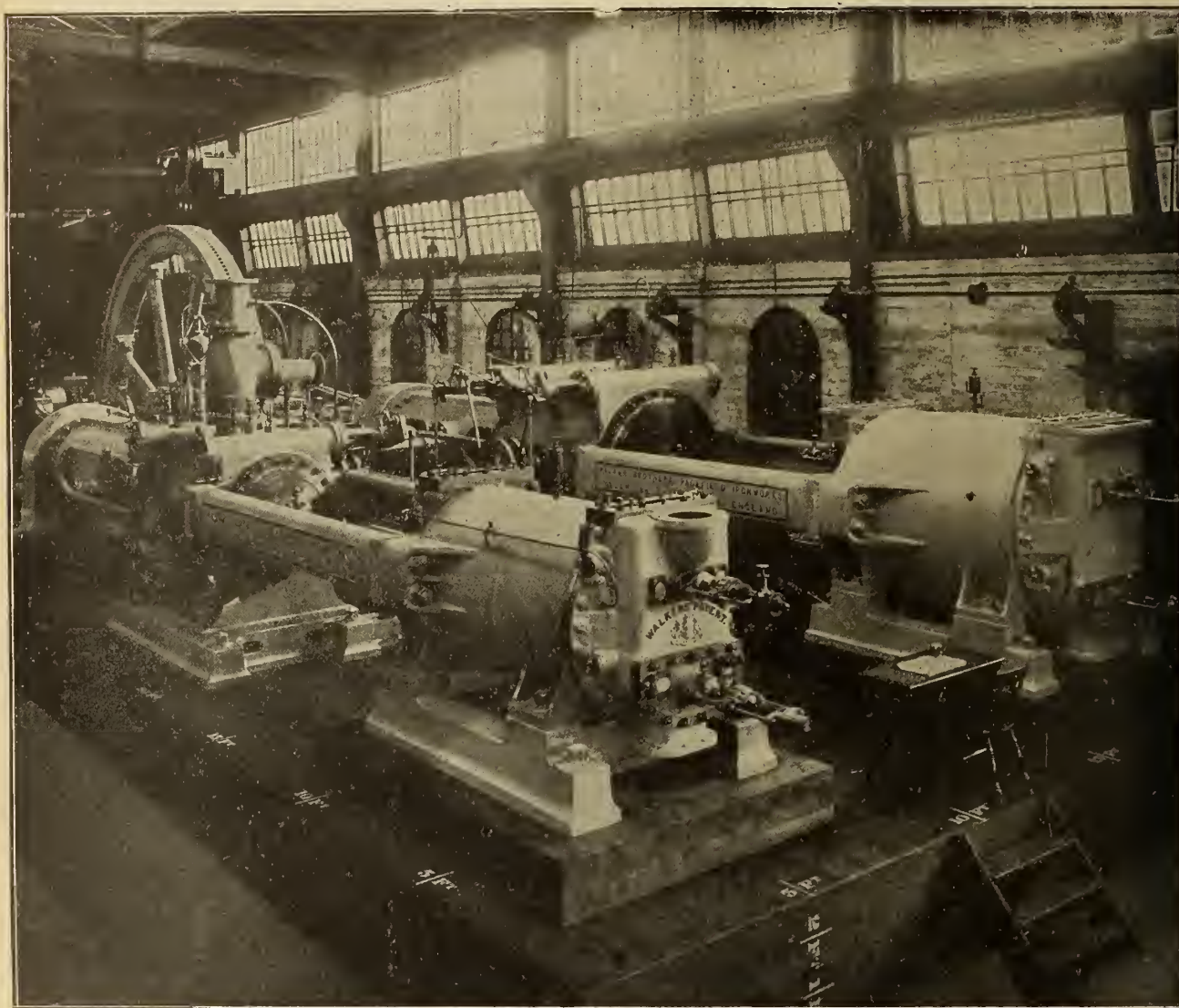
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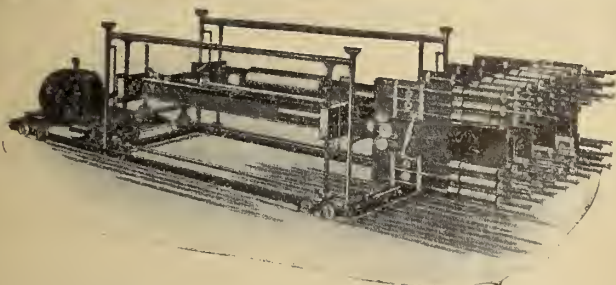
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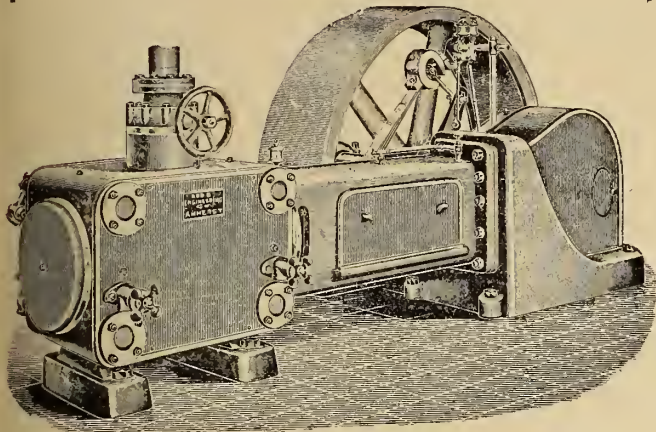
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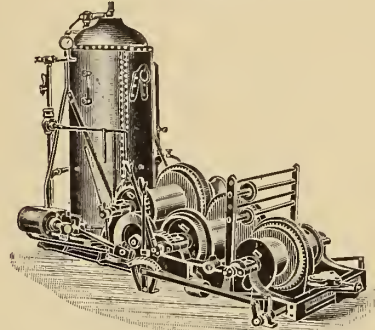
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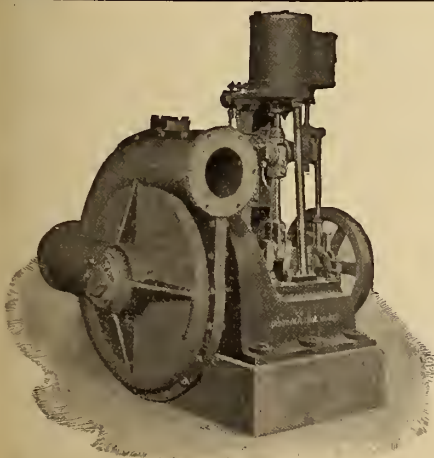
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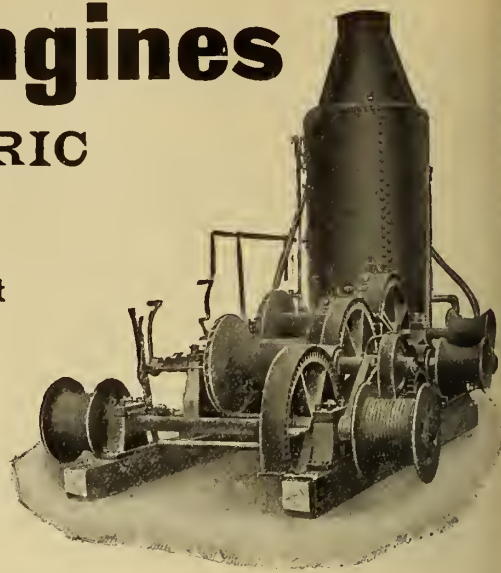
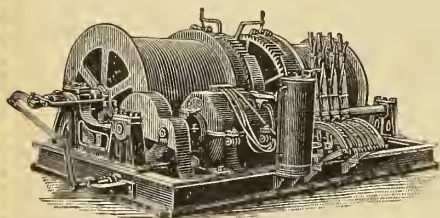
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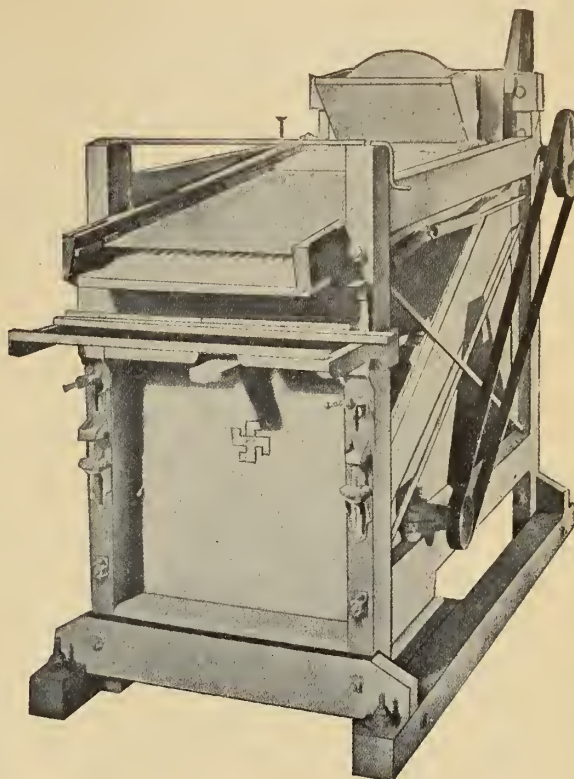
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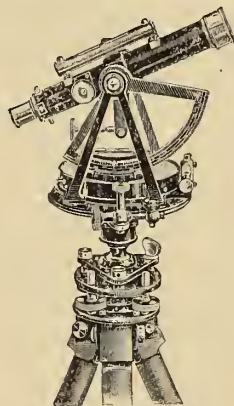
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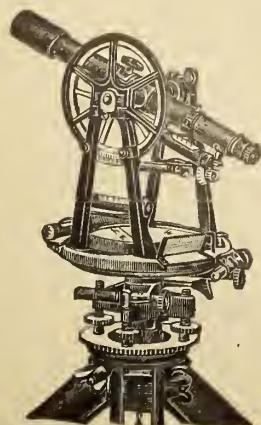
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The Secretary's Office and Library of the Institute have been removed to rooms 3 & 4, Windsor Hotel, Montreal, Que. Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

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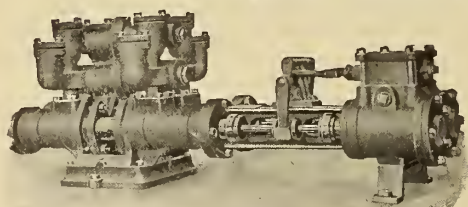
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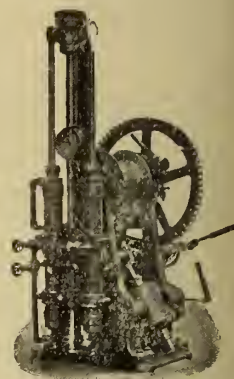
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, August 1, 1909

No. 15

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

**MINES PUBLISHING CO., LIMITED**

*Head Office* . . . Confederation Life Building, Toronto.

*Branch Offices* Montreal, Halifax, Victoria, and London, Eng.

*Editor:*

J. C. MURRAY, B.A., B.Sc.

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Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

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### RECIPROCITY IN COAL.

The article on reciprocity in coal, that appears in this issue, should arouse comment.

In the Maritime Provinces the question has long been discussed. With a few exceptions, the coal operators of the East appear to be vigorously opposed to the removal of tariff restrictions. On the other hand, there is decided, though not extensive, public sentiment in favour of reciprocity.

Throughout Quebec and Ontario reciprocity would be welcomed, merely because it is believed that the price of fuel would thereby be lowered. In the middle and far West there is a general sentiment in favour of reciprocity. It is urged that the adequate development of Alberta's and British Columbia's coal fields cannot take place until reciprocity is an accomplished fact. Roughly, this sketches the condition of Canadian opinion at present.

It is contended by western coal operators that reciprocity will benefit Canada generally, and that their eastern brethren will lose nothing if the tariff wall is razed. To this the easterners reply that free United States coal would swamp our markets completely.

We shall not reiterate here any of the arguments, facts, and figures adduced by Mr. Jacobs. Our intention is solely to arouse interest in a question that affects vitally the future of the Dominion.

Mr. Jacobs alludes to the surprising apathy on the part of the Canadian public in regard to reciprocity in coal. So marked is this apathy that the activity of Nova Scotian operators is thrown into undue relief. When Parliament was discussing the subject last winter, the views of the larger coal mining interests of the East were forcefully presented. Western interests claimed and received scant consideration. Hence there was little debate, and no constructive measures were suggested.

Apart from sporadic paragraphs in the public press, hardly one attempt has been made to ventilate the situation fairly. The pronouncements that have appeared in Montreal papers, presenting the case for the East, must be regarded as, in some degree, special pleading. Similarly, western views have been set forth in local publications.

The only presentation of the question from a national point of view came from the pen of Mr. D. D. Mann, in a recent number of *The Saturday Evening Post*. Mr. Mann, having spun webs of steel over half the continent, has become something of a publicist. And there are few men of affairs to whom we can listen with more profit. His attitude towards reciprocity may be summed up in two sentences from his own article: "I cannot, at the moment, think of any considerable

manufacturing advantage that would be sacrificed by a readjustment of the coal tariff." And, "The tariff is, at best, an expedient. As its crude necessities are outgrown and the distribution of Nature's favours is better understood, the courses of trade will find their natural channels, and Canada, handicapped at the beginning by the wider range of business possible to her southern neighbour, will come into her own."

Mr. Mann, however, is too wise to give any degree of finality to his utterance. He recognizes tacitly that the last word cannot yet be said. The whole situation requires thorough, deliberate, and wide consideration.

It is evident that what will suit the West will not meet the approval of the East, and vice versa. Each party is confident that its point of view best conserves the interests of Canada as a whole. Both cannot be right. Somewhere in between lies the most profitable course.

Will it not be possible for the conflicting interests to meet and attempt to evolve a *modus vivendi*? It is not unreasonable to suppose that eastern operators know their own business best. Similarly, western mine owners should be the most competent judges of their own requirements. Instead of clashing at Ottawa, would it not be well to meet peaceably at Winnipeg!

Meanwhile the day is fast approaching when Canada will determine for herself whether she desires or does not desire reciprocity. Every year strengthens her position and places her less and less in the posture of a suppliant.

### GOWGANDA—ITS PROSPECTS AND ITS PERILS.

Anonymous destructive criticism and extravagant praise are two evils that threaten the silver mining regions of Northern Ontario. Of the two, the latter is immeasurably the more dangerous.

In its issue of July 17, *The Financial Post* of Canada, an enterprising weekly of somewhat nebulous convictions, devotes an editorial column to Gowganda. Quoting an anonymous "able mining engineer of undoubted authority," the *Post* accepts his statements and moralizes thereupon.

Before alluding to any of these statements, we wish to point out that our contemporary transgresses the rules of fair play and of editorial decorum in publishing such matter. The *Post's* strictures are based upon specific statements. They are directed against specific mining companies, the Mann, Bonsall, Bartlett, and Boyd-Gordon.

Disregarding the question as to whether these strictures are just or unjust, it is evident that the companies that are attacked are given no chance to defend themselves. The *Post* does not accept responsibility for its editorial, and the identity of the person whom they quote is carefully suppressed. As to his ability and standing, we must accept (or reject) the *Post's* warm asseverations. Hence our contemporary is in the posi-

tion of the small boy who puts pepper on the stove when no one is looking—and is prepared to sneeze with the rest.

If the *Post* feels called upon to attack mining companies and to dabble in mining generally, it must assuredly prepare also to speak and act for itself. Hiding behind the skirts of an unknown is neither sportsman-like nor edifying.

If the *Post's* informant is what the *Post* believes him to be, he was at least ill-advised to vent his opinions anonymously. But we believe that there is internal evidence to show that either the *Post* is misquoting its "expert," or, on the other hand, its "expert" is a broken reed.

One sentence from the editorial in question calls for comment: "That he [the expert] is conservative is," says the *Post*, "evidenced in his statement that the Cobalt mines have probably reached the climax of their high-grade production." Now, this is not conservatism; it is exactly the antithesis of conservatism. The conservative mining man does not draw a bow at a venture. He gathers his evidence systematically and carefully, and formulates his conclusions sanely from observed facts.

A conservative mining engineer might easily come to the conclusion that Cobalt had passed its zenith. An utterly incompetent person might also come to the same conclusion. Hence the conclusion has nothing to do with the case. Obviously the thing that counts is the method employed in reaching the conclusion. Our contemporary has fallen into the common error of confounding conservatism with pessimism. The most conservative mining engineer in the world would neither lose nor gain in conservatism by speaking highly or disparagingly of Cobalt or Gowganda.

The point made by the *Post* regarding the fact that practically no ore has yet been shipped from Gowganda is not well taken. There is ample time yet for this. Its reference to overequipment is fair. But the whole editorial loses meaning because of its dubious birth.

When next the *Post* wishes to instruct its readers in this direction, we suggest that it take time for meditation. The only straight course is to get your facts first-hand and tell the truth boldly off your own bat.

It is yet too early to jump to conclusions concerning Gowganda. Development has been slow. The silver-bearing veins have proved irregular. Transportation facilities are lacking. The camp has not settled down to efficient production. The effects of extravagant advertising and injudicious expenditure are apparent. These will handicap the camp for a long time. But sooner or later, legitimate mining, conducted by efficient engineers, will determine the destiny of Gowganda. When that time arrives we shall know whether Gowganda is to be a second Cobalt or a flat disappointment. Neither subsidized eulogies nor the opinions of a thousand "experts" can alter by one milligram the silver contents of the new North.



**PUFFING.**

It is bad enough to read ordinary newspaper puffs of mining districts. Usually these purport to be interviews with "eminent" engineers. Always they are overdone.

But it is worse to see responsible officials misquoted. One of the most offensive specimens of misquotation has been brought to our attention. The Mining Age, of New York, in its issue of August 10, published an absolutely spurious quotation supposed to have been extracted from a public address delivered by Dr. W. G. Miller.

Here is the quotation:—

"In a recent address at Cobalt, Prof. Miller said:

'Values at Cobalt will reach at least to a depth of 400 feet. On the Lawson property the geology is such that it is only reasonable to expect the values to go deeper there than anywhere else in the camp. The Kerr Lake, which adjoins, is mining high-grade ore at 400 feet. The history of the Crown Reserve is well known. The ore is so full of metal that it takes only six cubic feet to make a ton. Assuming a length of 600 feet on the Lawson and an average width of high-grade ore of one foot, there is already in sight 100 tons for every foot in depth. The ore runs 7,000 ounces to the ton, but assuming only a net value of \$1,000 a ton, the first foot from the surface should yield \$100,000. One hundred feet of that vein will make 10,000,000, or practically the selling price of the entire La Rose mine. Such an estimate would be extremely conservative.

'These figures stagger the imagination, but it is easy to calculate. I do not believe that the mining engineers realize the value of the Cobalt camp, or, if they do, they are afraid to make their impressions public lest they be accused of exaggeration.' "

Not to mince matters, the writer who gave this to the Mining Age was guilty of deliberate fraud. The excerpt is given in quotation marks to make the statements appear as if they had been taken from a verbatim report. Dr. Miller did not make the statements attributed to him. The language in which the extract is couched is entirely misleading, and the whole article is designedly false. No decent paper should lend itself to such cheap touting.

**NEWFOUNDLAND.**

Ten years ago Canada was popularly supposed to be a fringe of snow-clad territory decorating the northern boundary of the United States. To-day Canada is the centre of attraction for emigrants of all nationalities.

Newfoundland to-day is still terra incognita. All the erroneous ideas that were current concerning Canada a decade ago are now current concerning Newfoundland. The ancient colony has not been properly advertized. Its people are profoundly insular. Its changing governments are tied hand and foot by fac-

tion and prejudice. Hence Newfoundland has remained voiceless, save when some rash Canadian suggests confederation or a Washington politician monkeys with the Fisheries Treaty.

Yet Newfoundland is a country of specific promise. Her mineral wealth is hardly touched. Of copper she has known, large, workable deposits. Her iron ore supplies the Sydney furnaces. Gold has been found, and is being worked. Coal of good quality and in fair quantity has been discovered. Gypsum, feldspar, building stones occur in abundance. Of tin there is rich indication. And so through the gamut of commercially valuable minerals.

A month or so past our representative visited Newfoundland. The first of his articles appears in this number of the Canadian Mining Journal. Others will follow.

**THE GLACE BAY STRIKE.**

The letter from our Glace Bay correspondent, to be found under the heading "Special Correspondence," is a clear resume of the present condition of the strike and of the causes that have led up to it.

Particularly interesting is our correspondent's delineation of the objects and methods of the United Mine Workers. With some surprise we learn that "the U. M. W. A. have five of their officers from the United States, assisted by a clerical force of two female clerks and a male clerk." This staff has been imported for the express purpose of destroying the Provincial Workmen's Association and holding up the Dominion Coal Company.

There appears to be no room left for moral suasion. We are strongly of opinion that the Federal authorities should promptly deport the leaders of this senseless agitation. This is about the only complete safeguard that remains.

**EDITORIAL NOTES.**

Our London contemporary, The Mining Journal, is to be congratulated heartily upon its improved dress. Beginning with its issue of July 3rd, The Mining Journal assumes a much more convenient size, and more orderly paging. This changes will be welcomed by its readers everywhere. Changes of this kind are, from many causes, exceedingly difficult to make. Sentimental considerations are not the least important deterrents.

The benefits of constantly improving methods of coal mine inspection are strikingly illustrated by comparing statistics of 50 years ago with those of to-day. The average output per person killed for five years up to 1860 was 74,674 tons. The output for 1008 per person killed was 210,815 tons, or almost three times the amount of coal raised per person killed.



The director of the Geological Survey, Mr. R. W. Brock, who was in hospital in Ottawa during the former half of July, continued to transact much routine business by telephone from his sick-room. Immediately on leaving the hospital Mr. Brock, although hardly able to walk, took train for British Columbia, there to join the

Hon. Mr. Templeman in an official tour of inspection. This is an almost dangerous instance of enthusiasm.

Mr. Alex. Gray's eminently useful summary of the progress and financial status of Cobalt mines is noticed in another column.

## MINERAL RESOURCES OF NEWFOUNDLAND.

(Written specially for The Canadian Mining Journal.)

"Newfoundland is a country that has undergone many vicissitudes during the earlier geological epochs," said J. P. Howley, F.G.S., Government geologist of the colony, in a paper recently read before the Canadian Mining Institute. "Its rock structure consists chiefly of the most ancient series comprised within Archaean, Eozoic and Palaeozoic times, such as the Laurentian, Huronian or Pre-Cambrian, Cambrian, Silurian, Devonian and Carboniferous. It is, consequently, one of the oldest countries in the world.

Large areas are found to be occupied by igneous, eruptive and igneo-aqueous materials, otherwise highly metamorphosed sediments, indicating prolonged volcanic action at different periods of its structural history.

"Still later, during the post-pliocene glacial epoch an immense ice-mantle seems to have enveloped the whole surface of the country. This ice-cap, descending from the higher elevations towards the sea, acted like a cyclopean ploughshare. It tore up and pushed or carried along with it everything that came in its way, scattering broadcast over the surface innumerable granitic and other boulders and planed down the entire face of the country. It was this same agency that moulded the country into its present contour of smooth, rounded, rolling ridges and low valleys. There are no sharp, serrated peaks, such as are visible in non-glaciated countries. Here and there throughout the interior a few isolated, truncated bosses of granite or trap rear their heads above the general level. These are known locally as "Tolts" and correspond closely with the American "Butte" or the South African "Kopje".

"In several respects the geological structure of Newfoundland bears a striking resemblance to that of parts of England. On its eastern seaboard we have the structure of Wales repeated in the Cambrian deposits. Sediments of an almost identical character, holding similar fossil organisms, are found on the shores of all the principal southern and eastern bays, even the celebrated Carnarvon slates being repeated here.

"Fossils of the Silurian and Carboniferous ages, while closely allied to those of both the Eastern and the Western Continents, nevertheless, possess some local peculiarities which seem to point to a transitional or intermediate stage between the two. This would go to bear out the expression that "Newfoundland is a stepping-stone between Europe and America."

"It would be but reasonable to expect that in a country so composed of the most ancient rock formations, one that has undergone so many changes, mineral wealth of no mean order should occur. Such has been abundantly proven to be the case; although mining may be looked upon as still in the infant stage."

### Copper Mining.

Mining on a large scale was initiated about forty-five years ago, when one of the Tilt Cove mines was

opened. Several other copper mines have been operated in Newfoundland within recent years:—Betts Cove, opened in 1875, and Little Bay in 1878. The scale on which the Betts Cove mine was worked may be judged from the fact that when work there was in full blast the yearly wage bill was upwards of \$125,000. Unfortunately, combination of low prices and financial difficulties drove the operating company out of business and this mine is now lying idle. Little Bay mines were also abandoned for practically the same reasons. It is believed that considerable quantities of ore are still waiting the miner at both these locations and local companies are now negotiating for the reopening of the old mines. Two most promising copper areas are now being vigorously prospected, one at York Harbor, Bay of Islands, in the west of the Island, and the other at Goose Cove, Hare Bay, in the north. Plants are being installed at both locations and it is anticipated that in the near future these new workings will become large copper pro-



Reid's Granite Quarry, near Gander Lake.

ducers. At Goose Cove it is expected to have 3,000 tons ready for shipping at the end of the present season.

Practically all the prospecting has been done on the coast of the island. This has been rewarded with numerous indications of copper ore. In the southern part of the island it has been found that the Huronian series contains very rich ores of copper glance, tetrahedrite and bornite. The Government geologist reports that native copper occurs in large quantities in Placentia Bay, on Oderin Island. Some portions of the rock in this location—greenstone and amygdaloidal trap—are quite rich in the metal, which is disseminated throughout in the form of fine scales or particles. At one place where the overhanging cliff had fallen down, large masses of copper were found amongst the debris. The Newfoundland Development Co., the big concern controlled by the Harmsworths, which is developing the pulpwood on so large a scale, has discovered copper near Red Indian Lake, in the very heart of the interior. Statistics from





the Newfoundland geological department show that up to date 1,319,594 tons of copper have been shipped from the various mines of the island. To this can be added 78,015 tons regulus and 5,418 tons copper ingots produced in the same period. The percentages of copper in these ores ranged from 4 to 30 per cent. Taking the average as 15 per cent the total yield of metallic copper would be over 210,000 tons.

#### Iron Mining.

Practically every variety of iron ore is found in Newfoundland, although only one location has been developed to any extent. The area in question is in Conception Bay, on Bell Island, and is one of the most profitable mines ever operated. Referring to this area in a recent report, Mr. J. P. Howley makes the following observations:—"Great Bell Island is one of a group of



three islands situated in Conception Bay, near its south side. It is the largest and lies furthest out from shore; is about six miles long by about two miles wide, having a surface area of twelve square miles. It forms, with the other two islands, the remnant of what was once a great trough of Cambrian rocks, which occupied the entire area of the bay. The former existence of this trough is plainly indicated by the presence of narrow fringes of its basic members, stretching along the shores of the bay on either side. On the south side, a fringe of about one mile wide extends along shore some ten miles, facing the bay and dipping towards the water, while on the north side, on the outer headlands, isolated patches of similar rocks are met with, dipping in the opposite direction, also towards the water. The islands above mentioned form the highest portion of this former trough now visible, but the centre of the trough must still lie out beneath the water, some three or four miles north from the great Bell Island. Numerous typical fossils of the upper Cambrian series are found on this island, the strata which lie pretty flat, have a general inclination towards the north at an angle of 8° or 9°.

Interstratified with the shales and sandstones, composing the structure of the island, there are altogether twelve bands of ore, ranging in thickness from one to ten feet. The two largest bands near the top of the section are situated on the northern slope of the island, and occupy the segment of an ellipse. So accessible are these beds, and so little capping of rock or debris covers their out crops, that almost every ton of ore they contain can be recovered. The Nova Scotia Steel and Coal Company were the first to operate a mine here. They commenced work in 1895, when they shipped their first cargo of ore. In 1899, they sold out the lower and larger bed to the Dominion Iron and Steel Company, since when the work of mining has been vigorously prosecuted by both companies. Up to the end of last year they had shipped between them 7,000,000 tons of ore, and have still in reserve, on the land area alone, about 25,000,000 tons. Most of the Dominion Company's ore goes to the smelting establishment of that company in Sydney, Cape Breton, while that of the Nova Scotia Company finds its way to various markets in both Europe and America.

Both these companies are the holders of large submarine areas, covering the ore deposit under the bay. That of the N. S. Company comprising 33 square miles. In view of the rapid diminution of the ore on the land area of the former company, they have, during the past two years, been driving out under the water, in order to reach their claim, which is situated three-quarters of a mile from the shore, the latter company holding a claim for the first mile contiguous to the shore of the island. Two main parallel drifts, commencing on the land, and following the slope of the ore bands seaward, have now reached well within the company's boundary. In driving this slope the ore has been found to maintain its general character throughout, but to increase both in thickness and quality as the centre of the trough is approached. By the aid of the dips and strikes of the strata it is possible to form a fair idea of the extent of the trough. Unless some unforeseen disturbances should occur cutting off the ore, or throwing it out altogether, and provided the ore bands maintain their thickness and regular stratified character throughout, a fairly reliable result can be arrived at. According to this mode of figuring then, I find the trough should contain the enormous amount of 3,635,543,360 tons. Of course this estimate takes into account all the ore bands now known to exist on the island."

**Iron Pyrites.**—This is an abundant mineral in Newfoundland, especially in that section known as Notre Dame Bay, where it occurs in connection with copper-bearing ores. Only at one place has mining for this material been carried on to any considerable extent. From this mine, at Pilley's Island, over half a million tons were shipped during the last twenty-five years. The product of this mine averaged about 50 per cent. sulphur. Deposits of this mineral are also being prospected at Bay of Islands and at the south-west arm of Green Bay.

**Lead.**—Numerous veins of galena have been discovered in various parts of the island, but more especially around Placentia Bay. At one place in this neighborhood, named LaManche, mining was at one time carried on on a large scale, about twenty thousand tons of the ore being taken out.

**Chromite.**—There are several known deposits of this valuable mineral on the island. Mining on a small scale was carried on for some time by the Humber Consolidated Mining Co. at a deposit near Bay of Islands, and during the three years that the somewhat spasmodic operations were carried on about ten thousand tons were taken out and shipped.

**Precious Metals.**—Practically all Newfoundland copper ores carry considerable proportions of gold and silver and the amount of the former extracted from the ore taken out of the Tilt Cove mines adds considerably to the income of the company. A plant for the mining of gold is established at Mings, in Notre Dame Bay, although, for lack of capital, it is not at present worked. Gold is also known to occur at a point in White Bay, a little farther north than the last-mentioned location. The galena ores of Newfoundland are highly argentiferous and an authority states that they have run as high as 400 ounces to the ton. The most promising deposits of silver at present known are situated at a place named Lawn, in Placentia Bay.

**Building Stone.**—The best testimonials to the value of the areas of available building stone on the island are the public buildings in which the native material has been used. A splendid example is the building in St. John's, containing the Law Courts and some of the Colonial Governmental offices, Newfoundland sandstone from Kelley's Island, near the famous Bell Island mines, Conception Bay being used in its construction. The facing is syenite from a quarry situated at a place called Petites, on the south coast of the Island. Water Street, St. John's, is paved with granite blocks taken from a quarry of the Reid-Nfld. Co., in the interior. Marble has also been discovered in abundance and an effort is being made to form a company to develop one field situated on the the west coast. The marbles discovered have been of almost every conceivable shade of color. Other varieties of building and ornamental stone known to exist in workable quantities are porphyries, freestones, limestones, serpentines, soapstone.

**Roofing Slate.**—A large portion of the Avalon Peninsula, including, Placentia, Conception and Trinity Bays in the south of the island, is of the Cambrian formation and contains some of the best roofing slates quarried. The principal quarry is situated at Wilton Grove, in Trinity Bay. The slate is of various shades of color, dark purple prevailing and there is also an extensive band of pale sea-green color. Experienced Welsh slaters are employed in working the quarry, which up to date has produced over 150,000 squares, having a total value of something like \$450,000. The slate has been pronounced to be the equal of the best product of Carnarvonshire, Wales. One



of the directors of the United States Geological Survey, who examined the quarry, reported that "this is one of the great roofing-slate deposits in the world, being comparable with that of North Wales and the American deposits of Washington County and Rutland County, Vermont."

**Coal Areas.**—These are treated in a separate article. It is interesting to note here that Professor Jukes visited them almost half a century ago, and estimated that one area alone was about twenty-five miles long by ten in breadth. Of recent years a number of seams have been discovered, all of which are being tested by the government geologist, Mr. Howley.

Of other minerals that have been discovered in workable quantities we have antimony, manganese, and tin. A most promising deposit of the first-men-

tioned occurs on the north-east coast of the island at a place called Moreton's Harbor. An attempt was at one time made to mine it, several thousand tons being taken out and shipped. Extensive deposits of manganese of a low grade are found in various parts of the island, more especially around Conception Bay, where it occurs in conjunction with limestone. An attempt is now being made to mine this mineral at Manuels, Conception Bay. Recently a body of tin-bearing ore has been discovered at How Harbor, Har-Bay, in the far north of the island, and assays of some of the specimens taken out showed the presence of over two per cent. of tin. A big body of talc on the south side of Conception Bay is being worked. An overhead tramway and a large pier have been built and already several thousand tons have been shipped to the American market.

## COAL AREAS OF NEWFOUNDLAND.

By James P. Howley, F. G. S., Director Nfld. Geological Survey.

There are in Newfoundland three distinct carboniferous areas, one in the Codroy Valley, west coast, another in the country lying to the south of Bay St. George and the third on the upper reaches of the Humber River, Bay of Islands, in the region between Grand and Sandy Lakes. The first named is of very limited extent, being a mere segment of a trough, cut off by a great fault. There are two little patches of about a mile each in longitudinal extent, but the greatest thickness of the true coal measures does not exceed 250 to 300 feet in all. Nevertheless, within these narrow

its strike, gave an average thickness of 7 1-2 feet. The nine-foot seam was drifted upon for ninety feet, and about 100 tons taken out. Some of this coal was used by the Reid Railway Co. on their locomotives, with excellent results as a steam producer.

The Bay St. George coal area is in the form of a narrow trough situated some eight miles inland from the south shore of the bay. The full extent of this trough is not yet known, but it has been traced longitudinally for about five miles. Three brooks which have cut channels across it afford the only sections of



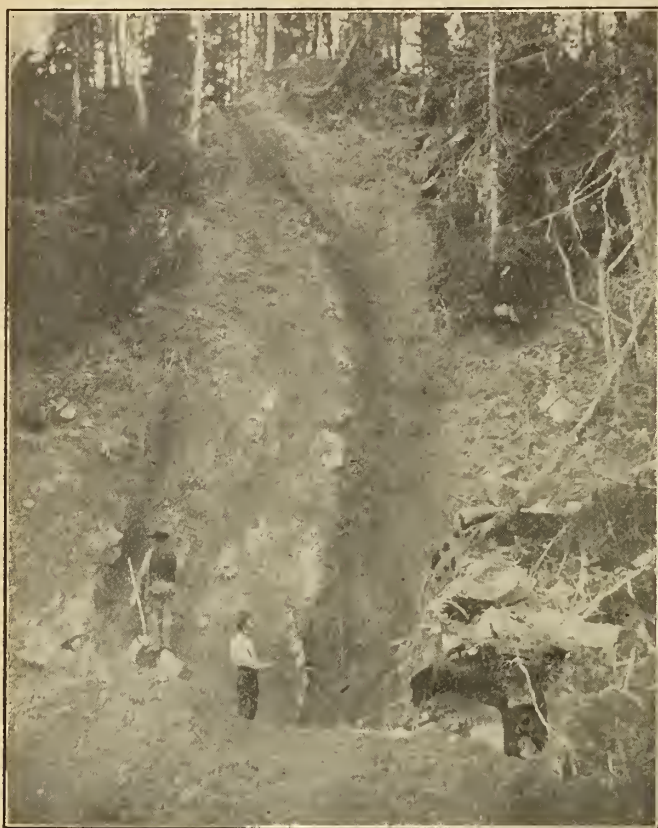
Diamond Drill at Work—Bore F, Kelvin Brook, Grand Lake.

mits there are six seams of coal, all standing in a vertical position. Four of the six are of small dimensions, but the remaining two are of some considerable extent. One at its outcrop showed 9½ feet of good, clean coal, while the other at one point was 23 feet wide, consisting of layers of coal, shale and clay, and containing 5 feet of fairly good coal. They did not, however, maintain this thickness throughout, but were found to vary considerably; the first had dwindled down to five feet, with only three feet of coal, while the larger seam, which was uncovered at five different places along

the measures. On the most westerly of these, called the Middle Barachois, a good section of about two miles in extent is exposed. When this was stripped with pick and shovel twelve separate seams of coal were revealed, on the north side of the trough toward which they dipped, most of them being also uncovered on the opposite side.

The seams ranged in thickness from a few inches up to over five feet, and the coal in several was of first-class quality. On Robinson's River, two miles east, and on one of its tributaries, small exposures of the





No. 6 Coal Seam—West Side Aldery Brook.

coal measures were again met with. The Robinson's River section contained three seams, one of which gave a thickness of 4 feet 2 inches of good solid coal, and on a northern feeder of the River four seams were uncovered. Only one of the latter was of any importance measuring in width 1 foot 6 inches, the coal of an exceptionally superior quality, being clean, bright and semi-anthracitic in character. It was low in sulphur, burnt with a bright, clear flame in an open grate, and left but a small percentage of ash.

The coal seams of one foot and over in thickness so far discovered in this trough are as follows:

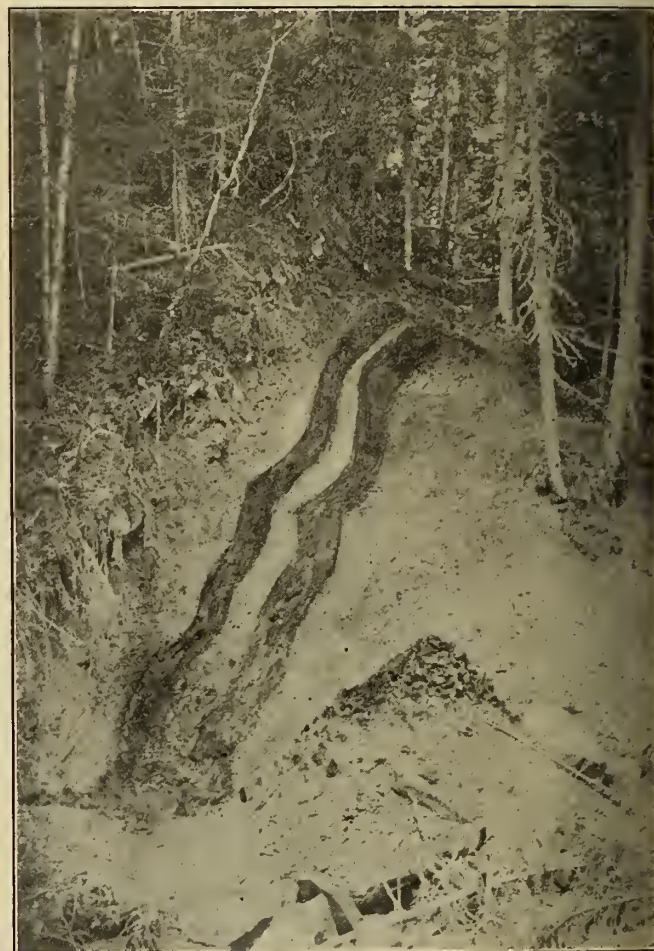


Coal Seam, Codroy.

|                    | Ft. | Ins. |
|--------------------|-----|------|
| Murray Seam .....  | 5   | 4    |
| Rocky Seam .....   | 1   | 5    |
| Clay Seam .....    | 1   | 8    |
| Slaty Seam .....   | 1   | 4    |
| 18-inch Seam ..... | 1   | 6    |
| Jukes .....        | 4   | 6    |
| Cleary Seam .....  | 2   | 2    |
| Howley Seam .....  | 4   | 2    |
| Shears Seam .....  | 1   | 2    |

The aggregate thickness of all the seams in this trough is 27 feet, which, should they maintain this average throughout, would give 25,920,000 tons of coal for every mile of superficial area they underlay.

In the Humber Valley, the Carboniferous series spreads over fully five hundred square miles of coun-



Coal Seam on Coal Brook, Grand Lake.

try, but by far the greater portion of this is occupied by the lower and unproductive members of the series. Here again the true coal measures are confined to a long, narrow trough, which extends along the south side of Grand Lake some four or five miles, and thence strikes north-easterly into the flat country lying between Grand and Sandy Lakes. This trough has now been traced over eleven miles on its strike and in all probability it terminates in Sandy Lake, some six or seven miles further on!

The country hereabout is very difficult to explore owing to the immense accumulation of superficial debris, in the shape of sand, gravel and boulders, spread out over the surface in all directions and effectually concealing the structure beneath. Of late years the



Calyx boring drill has been brought into requisition to test this coal field and we are gradually acquiring a fuller knowledge of its extent and possibilities.

One small section has been uncovered at Aldery Brook on the south side of Grand Lake, two miles from its head. Here the trough is very narrow and lies close up against the Laurentian Hill range. It does not exceed altogether a quarter of a mile in width, yet it contains thirty outcrops of coal, all crowded together, in a nearly vertical position. Owing to the doubling



Camp MacGregor, Coal Boring.

up of the strata these outcrops, in reality, only represent fifteen distinct seams. They vary from a few inches up to six-and-a-half feet in thickness. The largest seam was drifted upon for 150 feet, and a great deal of coal of excellent quality was taken out. Several of the other seams were also partly opened up and some good coal extracted from them.

Six seams in this section exhibited the following dimensions at their outcrop: 2ft. 0in.; 1ft. 6in.; 1ft. 8in.; 6ft. 6in.; 3ft. 0in.; 2ft. 6in.

One-and-a-half miles further east, on Coal Brook, eighteen outcrops were observed, representing nine different seams. Here the trough begins to widen out somewhat and the angle of inclination of the bedding assumes a dip of 50 deg. or less. Six of the seams had the following dimensions: 1ft. 4in.; 3ft. 5in.; 1ft. 0in.; 1ft. 6in.; 2ft. 4in.; 1ft. 0in.;

On Kelvin Brook, two-and-a-half miles still further south along the strike, a small section on the south side of the trough exhibited six seams, three of which showed: 3ft. 8in.; 2ft. 6in.; 6ft. 2in.; The Reid Nfld. Railroad Co. mined one of these seams for a while taking out about 7,000 tons of coal, all of which was used on their locomotives, with quite satisfactory results.

Three-and-three-quarter miles eastward, where the railway crosses the trough, three seams were discovered by sinking pits through the gravel and sand. They were all on the south side of the trough, dipping nearly north, at a much lower angle, indicating a considerable widening-out of the measures. Owing to the utter impossibility of accomplishing any further effective work here with pick and shovel, recourse was next had to the boring rod. Ten holes have been put down at short intervals apart and several new seams thus discovered. Seventeen seams were bored through during the past two years, which, with the three previously mentioned, making twenty altogether, so far discovered in the Grand Lake section. As in the other cases, they vary from a few inches up to something over three feet. Nine of them ranged from one foot upwards, as follows: 2ft. 6in.; 3ft. 4in.; 1ft. 6in.; 3ft. 0in.; 2ft. 6in.; 1ft. 0in.; 2ft. 4in.; 1ft. 0in.; 1ft. 6in. Several thousand tons of coal were also taken from this section by the Reid Nfld. Co. and burned on their locomotives. It is at present impossible to estimate the amount of available coal in this area, but it must unquestionably mount into many millions of tons.

The following analysis will give some idea of the composition of these coals:

#### From Bay St. George.

|                    | Clary<br>Seam. | Jukes<br>Seam. | Howley<br>Seam. | Shears<br>Seam. |
|--------------------|----------------|----------------|-----------------|-----------------|
| Moisture . . . . . | 3.548          | 3.036          | 2.784           | 4.90            |
| Volatile matter    | 30.897         | 30.344         | 29.784          | 33.12           |
| Fixed carbon . . . | 55.229         | 60.142         | 54.468          | not given       |
| Sulphur . . . . .  | 3.946          | 1.963          | 3.047           | 0.44            |
| Ash . . . . .      | 6.380          | 4.515          | 10.430          | 3.16            |
|                    | 100.000        | 100.000        | 100.000         | Coke 61,371     |

#### From Coal Brook.

|                                    | No. 3. | No. 4. | No. 1. |
|------------------------------------|--------|--------|--------|
| Moisture . . . . .                 | 9.93   | 5.02   | 8.44   |
| Volatile matter . .                | 24.01  | 31.25  | 28.54  |
| Fixed carbon . . .                 | 49.15  | 54.03  | 50.07  |
| Ash . . . . .                      | 16.14  | 8.66   | 11.53  |
| Sulphur . . . . .                  | .77    | 1.04   | 1.42   |
|                                    | 100.00 | 100.00 | 100.00 |
| Coke in closed<br>vessel . . . . . | 66.06  | 63.73  | 63.92  |

#### From Kelvin Brook.

|                                 | No. 2. | No. 6. | No. 7. | No. 9. | No. 15. | No. 16. | No. 17. | No. 20. |
|---------------------------------|--------|--------|--------|--------|---------|---------|---------|---------|
| Moisture . . . . .              | 10.22  | 5.80   | 10.77  | 13.71  | 15.78   | 5.82    | 4.32    | 7.41    |
| Volatile matter . . . . .       | 24.39  | 31.44  | 16.55  | 26.83  | 30.30   | 33.62   | 16.84   | 30.73   |
| Fixed Carbon . . . . .          | 48.51  | 57.86  | 33.89  | 51.06  | 45.29   | 55.28   | 72.66   | 52.49   |
| Ash . . . . .                   | 15.72  | 4.08   | 37.86  | 7.56   | 8.08    | 4.49    | 5.53    | 7.71    |
| Sulphur . . . . .               | 1.16   | .82    | .93    | .84    | .55     | .79     | .85     | .66     |
|                                 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00  | 100.00  | 100.00  | 100.00  |
| Coke in closed vessel . . . . . | 65.39  | 62.76  | 72.68  | 59.56  | 33.92   | 60.56   | 78.84   | 61.86   |



## BETTS COVE MINE.

Betts Cove is situated in Notre Dame Bay on the north east coast of Newfoundland. It is reached from St. John's, the capital, first by railway to Erploys, a distance of 260 miles, and then by steamer, run in connection with the railway system, a further distance of 125 miles. The Cove itself is about 2,000 feet wide at its entrance, narrowing to about 200 feet at the head, and is about three-quarters of a mile in length, with a slight curve westwards. It is surrounded by perpendicular, sometimes overhanging, cliffs. A short distance back from the head of the Cove a high mass of rock stretches obliquely across and, trending westward, leaves a narrow ravine, the situation of the famous little mining town.

All along the shore of Notre Dame Bay and in the islands that dot its waters, numerous copper deposits of ranging extent have been found. Betts Cove is apparently the centre of this belt or zone of mineral.

posit was worked uninterruptedly, 117,000 tons of ore were shipped. The suspension of operations was then caused by a cave-in of the mine due to the robbing of the pillars of their ore. This tribute system was inaugurated to offset the damage done by the fall of a huge bluff which destroyed much of the plant. Financial difficulties, coupled with the low price of copper—£44 10s.—prevented the company from reopening this promising mine. The magnitude of the operations carried on while the deposit was being worked may be judged from the fact that in one year about £95,000 were paid out in wages.

When the mine was closed down a most complete plant was left standing there. Two substantial wharves were ranged along either side of the Cove and provided mooring space for several large vessels at a time. The principal buildings of the town included large warehouses and shops, the manager's residence,



BETTS COVE.

The enclosing rocks are chiefly diorites and serpentines, with some metamorphic formations, and belong to the lower Silurian system. The cuperiferous and pyritic ores are found in veins more or less continuous, and in pockets of varying sizes. In places the ore is free from any admixture of gangue filling, but where the latter is present it invariably consists of, chloritic slate, often heavily charged with iron and sometimes copper. The surface indications of the ore deposits generally consist of "gossan" and ironstone, usually much weathered and decomposed. The ore is a sulphide containing copper varying from one-half per cent. to twenty per cent. A promising body of pyrites has also been uncovered and samples of it have assayed from 43.75 to 46.74 per cent. of sulphur.

Operations were commenced at the Betts Cove mine during 1874 and the first shipment of ore was made in 1875. For the next ten years, during which the de-

and a number of other houses, occupying the foreground of the Cove. Behind these buildings was the barracks, a long, low building, occupied by the unmarried officials and containing also the surgery and dispensary. In the background were a number of other buildings, miners' houses and boarding-houses.

On the western side of the Cove, high up the hill, were the reverberatory smelting furnaces, enclosed in a large wooden building. Attached to this was a laboratory. At the head of the western wharf was situated smelting works, of more recent construction and containing six cupel furnaces.

The mine is situated about three-quarters of a mile west of the Cove, although to reach it via the road would entail travelling a much greater distance. The mouth of the shaft with its engine-house and hoisting machinery is at an elevation of about 500 feet above high-water mark. Near the mouth of the shaft is a



large copper floor, roofed over, on which the ore received from the mine was spread out and sorted, the larger masses being broken up to a size convenient for handling and being also freed from rock and iron pyrite. The culled material was afterward taken to a small lake, where it was washed with a hose and again carefully picked over. The better quality of this ore was afterwards shipped with the ordinary ore from the mine, while the poorer quality was sent to the smelting works to be converted into regulus. A tramway of ore 1500 yards in length conveyed the entire product of the mine to the waterside. For the first six or seven hundred yards there was a slight up-grade and the cars, each containing two tons of ore, were pulled over this by horses. Then succeeded an incline of 150 yards and a level section of about a quarter of a mile. The last section of the track, inclined at an angle of about 20° led directly down to the wharf.

This extended notice has been given the old Betts Cove workings and plant for several reasons. They show from the big plant installed, that the company carrying on operations had pinned its faith to the locality and was only forced out of business by poor management and financial troubles. Recent investigations have also convinced the Pillies Island Pyrites Co. that the deposits of pyrites referred to above will well repay working, and they have now upwards of 1000 tons piled on the surface, with as much more in sight, the result of a drift 36 feet long, so that in the very near future Betts Cove will again probably become a producer. Also, the old mining headquarters here was a centre from which radiated prospecting efforts all over the surrounding district. These prospecting tours resulted in the discovery of mining locations whose development promised much profits. Two of these deserve special mention, both being copper deposits. One

at Burton's Pond, is situated about two miles west of Betts Cove and here, when operations were stopped at the latter place, about 100 tons of copper ore had been deposited on the surface. Serpentine rocks have been found to run along the south-eastern side of the pond, being interstratified with quartzite, diorite and slate with steatitic bands. At the entrance of the pond there



Loading Pier, Betts Cove Copper Mine.

is a considerable display of copper pyrites and sulphide of iron, and it was here that mining operations were begun.

The second location to which reference has been made was at South West Arm, a few miles up the Bay from Betts Cove. The ore mined here was of a superior quality, yielding 26 per cent. of pure copper.

### PILLEY'S ISLAND MINE.

Pilley's Island is situated in Notre Dame Bay, on the north east coast of Newfoundland, and at a distance of about 250 miles from St. John's, the capital city of the colony. The geology of the island is similar to that of the other copper bearing areas of Newfoundland. The ore is found associated with serpentine, the strata consisting largely of chlorite slate, diorites, and



Pier at Pilley's Island.

olomites. The ore mined here is of excellent quality and is almost chemically pure, assaying 45 per cent. sulphur, 52 per cent. iron, 2 per cent. copper and about 1 per cent. alum. It is contained in a lenticular vein which dips 25° from the horizontal, the ore on this incline being traceable for over 700 feet.

Mining operations on Pilley's Island commenced in 1886 and were carried on uninterruptedly until 1899. Then for two years operations were suspended, but the mine re-opened and worked again until 1907 when it was again closed owing to the financial embarrassment of the Pilley's Island Pyrites Co., the owners, mainly New York capitalists. Arrangements have, however, been made by which it is likely that this mine will be once again opened up this season.

When operations were suspended in 1907 the prospects of the area were unusually promising. A 300 foot shaft had been sunk through the main one vein and various drifts made through it. A body of ore, 150ft.x140ft.x20ft. had then been blocked out from the fifth to the seventh level. The specific gravity of the ore is about 5, which gives an equivalent of about 7 cubic feet to the ton. A simple calculation from the figures given above will show that about 60,000 tons of ore are at present available. The continuity of the ore band has been proven by diamond drilling and sufficient data have been gathered to indicate the presence of a further quantity of 100,000 tons of ore.

The mine plant is an up-to-date one. It includes a 150 h.p., high-pressure, friction engine, with double drawn for hoisting purposes; an air-compressor of sufficient capacity to run fourteen rock drills; four return tubular boilers developing 700 horse-power, a 7 k.w. electric dynamo used exclusively for lighting the mine. There is also a thoroughly equipped machine shop and a smithy, in which mechanical apparatus is installed.





SHAFT HOUSES AND POWER PLANT OF PILLEY'S ISLAND MINES.

Ore pockets with aggregate capacity of 4,000 tons have been provided and are used during winter months when shipping is suspended. The mine equipment also includes a crusher fitted with inclined screens and conveyors.

Shipping facilities are such that ships of 5,000 tons

displacement can lie at the pier head within half a dozen yards of the shore and receive cargo. The harbor is commodious and is almost landlocked. There is plenty of timber in the neighborhood and conditions are such as to render mining operations possible at low expense.

### HARE BAY MINES.

North of a line drawn across the Island of Newfoundland from the bottom of White Bay on the east coast to Bonne Bay on the west coast, the great northern Peninsula stretches for upwards of one hundred and twenty-five miles towards the coast of Labrador being separated from the latter at its northern extremity by the narrow Straits of Belle Isle. Its shores both east and west are bold and precipitous and are indented with many fine bays and harbors. Towards the northern extremity of the east coast is an unusually large inlet known as Hare Bay, and several of the harbors and coves around this have recently become the scene of much mining activity. Attention has been given specially to Goose Cove, How Harbor and St. Julien's, in each case with encouraging success.

The Goose Cove property is situated adjacent to Goose Cape, which forms the extreme north-east corner of Hare Bay, where it opens on to the Atlantic. The rocks in which the copper lodes are enclosed are metamorphic and, like all the well-known deposits of Newfoundland, they occur in the supracrustal strata of the Quebec, or middle Silurian formation. The strata associated with the copper beds are slates, thin beds of fine conglomerates and quartzites. At the surface, owing to weathering, the beds are not conspicuous, but beneath they are more distinct and exhibit a dip toward the north east, though this, as well as their strike, is subject to variations. The slates between which the lodes occur are softer than the surrounding rocks, this facilitating sinking and drawing. The copper veins are interbedded with the strata and, necessarily, follow their flexures. In the concession which is now being prospected two copper veins have been traced. The main, or west, vein is a rather slaty bed of copper pyrites, containing no quartz or other gangue, and bearing a little east of north with a dip slightly inclined

eastwards. It has a width of two or three feet of compact copper pyrites which, when picked, yielded 8.85 per cent. copper according to an English assayer. The east vein is similar to the main vein with a nearly north and south strike. It is also interstratified with the slate, and has a surface width of from one to two feet. The deposits at Goose Cove occur in the same rock formation as, and under similar conditions to, the rich copper mines that have been worked in Notre Dame Bay, on the east coast of northern Newfoundland. Tilt Cove, for instance, has returned large dividends for many years and last year is stated to have made a profit of about £100,000.

A 74 foot shaft has been sunk through the main vein at Goose Cove and 12 men worked on the location all the winter, getting out 2,000 tons of ore. Analysis of this ore showed 10 per cent. copper; 24.6 per cent. sulphur and 19 per cent. iron, with traces of gold and silver. Mr. M. L. Parnell, one of the local owners of the location, has succeeded in forming a company in England, and an expert, representing the shareholders, is now on the ground directing operations.

The staff of miners is to be at once increased to 100 men and it is expected that by the end of July a first shipment of some 3000 tons of the ore will be made to Swansea. A recent report of the expert referred to, Mr. Brenton Symons, M.I.C.E., F.G.S., M.E., states the vein which, at the commencement of operations showed only two inches of ore, now shows 8 feet. The company will immediately erect the necessary machinery and expect to mine and ship at least 20,000 tons of ore before the close of the present season. The facilities for shipping are excellent. Goose Cove is a commodious harbor with a narrow entrance and perfectly sheltered from all storms. The depth of water is 20 to 40 feet and there are two or three spots where a 50



foot pier would be of sufficient length to load an ore boat of from 2,000 to 3,000 tons burthen. The mine is about three-quarters of a mile from the shore of the harbor.

St. Julien's is situated near the opposite, or south-east, Cape of Hare Bay. The copper lands are close to the shore. The country is very hilly, the prevailing rocks being limestone and granite, the quartz veins running straight, principally in a northwesterly and southwesterly direction, occasionally showing outcroppings of copper ore for hundreds of yards. A shaft sunk a short distance from the shore and about 35 feet above sea level showed a 13 inch vein of copper ore at a depth of five feet and when this had been extended to fourteen feet deep the vein had increased to 23 inches in width. Prospecting shafts were also sunk in several other places and in every instance the vein increased in width the deeper operations were carried, the quality of the ore also improving greatly. The widest vein of copper ore discovered in these prospects measured 2ft. 6ins., this at a depth of nine feet. An assay of the ore from this mine by a New York firm showed 14.65 per cent. copper and 26.19 per cent. sulphur; another by a German expert of three samples showed copper 26 per cent. 21 per cent. and 26 per cent in each instance,

will be brought into the camp at 44,000 volts, and the different mines will be fed at a voltage of 2,200.

Their plans call for the installation of one or two large electrically driven air compressors and they undertake to supply the mines with compressed air as well as electrical power. The cost per H.P. will be about \$50.00 per annum for a 24 hr. service.

It is expected that they will be serving their customers about Oct. 31, 1909.

#### Cobalt Hydraulic Power Co., Ltd.

CHAMBER—1,000 feet long, 20 feet wide and 26 feet high=100,000 feet (cu.).

INTAKE—347 feet, outlet 298 feet or a difference of 49 feet.

There will be two intake pipes 8 feet diameter and an outlet pipe of 22 feet. The two inlet pipes will be steel lined. The blow off pipe will be 12 inches in diameter.

This plant is situated six and three quarter miles south of the Kerr Lake siding of the T & N.O.R.R. at Ragged Chutes on the Montreal River. They will charge 25c per 1000 cu. ft. compressed air at 100 pds. pressure and at a.t. This is on their metered air power contracts.



PROSPECTING AT GOOSE COVE.

while an assay by Prof. R. E. Holloway, Government assayer, at St. John's, Nfld., showed copper 21.03 per cent with 3 dwt. gold per ton.

There are splendid shipping facilities here also. The harbor is commodious and well protected and the water very deep. Timber can be had in abundance and at small expense from a mill and lumber yard situated some little distance along the coast.

#### POWER DEVELOPMENT IN COBALT. MINES, POWER LTD. COBALT.

This plant is an electrical one situated on the Matibitchewan river some 25 miles from Cobalt. The company has the right to raise lakes feeding this power 40 feet. They will have a head of 312 which will be brought to the turbines through two steel tubes 5 feet in diameter. The electrical installation will consist of four generators 2500 H.P. each or 10,000 in all. It is proposed to keep one unite in reserve. There will be two transmission lines to Cobalt to prevent any break down, the right of way will be 135 feet. The current

The air will be piped to Cobalt at 110 pds. pressure through wrought iron pipes 20 inches in diameter and 40 feet long. These tubes are very heavy, the flanges being welded on. Each flange contains holes for 24 one-inch bolts, the holes being  $3\frac{1}{2}$  inches centre to centre.  $\frac{1}{16}$  inches cardboard is used as a gasket. Cement anchors are placed every half mile and between anchors expansion joints are placed. Loops supplying the mines will be 12 inch pipe. This company will also supply electric power.

Power from this plant is supposed to be supplied to the mines about the middle of October, but I think it impossible as the contractors that have the shaft sinking and tunneling for the chamber have had trouble with low water and in fact I heard that they had pulled out.

Cobalt should at last get cheap power as there will be two companies in opposition and looking for a market for their power. At present some of the mines are paying \$250 per drill per month on an 18 hour service. These two companies will do the same for less than \$4.00 per day, or say \$100 per month.



## RECIPROCITY IN COAL.—A WESTERN POINT OF VIEW.

Written for the Canadian Mining Journal by E. Jacobs.

Canada's total production of coal during all years to 1908, inclusive, has been about 131,000,000 tons; that of the United States about 7,284,000,000 tons. During five years, 1904-8, Canada produced 48,000,000 tons of coal; in the same period the United States produced 2,060,000,000 tons. Canada's production in 1908 was about 11,000,000 tons; that of the United States nearly 420,000,000 tons. With such extremely disproportionate production figures in view, the suggestion of reciprocity in coal between the two countries, if nothing else were taken into account, might well appear one that should be dismissed without further consideration. But there are other factors in the situation to be considered, and they are decidedly important in their relation to a question seriously affecting the industrial and domestic interests of extensive areas of the Dominion.

### The General Position.

Generally, the position seems to be this: There is an enormous quantity of coal of excellent quality in Canada—in the Maritime Provinces in the East and

in Alberta and British Columbia in the West, but practically none in about 2,000 miles of territory situated between Alberta and New Brunswick. On the other hand, there is no coal in the Northeastern United States; none thence immediately south of the International boundary line (excepting in Michigan) until North Dakota is reached, where lignite coal occurs; then there is coal in the Rocky Mountain region—Montana and Wyoming, and again there is coal (though not of nearly so good quality as that in British Columbia and Western Alberta) in the State of Washington. Thus nature, taking no account of future divisions such as have been brought about by the establishment of political boundaries, and ignoring artificial trade restrictions, placed much good coal in the far eastern and western parts of Canada respectively, but did not similarly favour the wide extent of intervening Canadian territory, thereby leaving this great expanse of country dependent in large measure for its fuel supply upon fields situated south of what afterwards became the boundary line between Canada and the States. So



• indicates working coal mines.

× indicates undeveloped coal mines.

The approximate market areas of the several mining districts are shown by the dotted lines. They are, reading from west to east, as follows: 1—Area supplied by Vancouver Island Coal Mines; 2—Small tributary to Nicola Coal Mines, recently opened; 3—Small tributary to Bankhead and Cannore, Alberta; 4—Small tributary to Edmonton, Alberta, Coal Mines; 5—Area, comparatively large, taking coal from Crow's Nest Pass Coal Mines in both British Columbia and Alberta, and others in latter province about Lethbridge, etc.; 6—Large area supplied by Pennsylvania, Ohio, etc.; 7—Large area supplied by Maritime Province Coal Mines.



it would appear, in these circumstances, that the natural position would be for the Maritime Provinces of Canada to be the chief source of fuel supply for the New England States, while Alberta and British Columbia would in large measure stand in a similar relation to the Pacific States. But the trade restrictions referred to, supplemented, or perhaps overshadowed so far as Canada is concerned, by vested interests and the stronger political influences of the Maritime Provinces, have combined, and appear determined, if possible, to strengthen their combination, to serve their own ends rather than assist in bringing about a change that fair play to coal consumers in Ontario and Manitoba and producers in Alberta and British Columbia demands.

#### Summary of Coal Mining in Canada.

Of the coal mining industry of Canada as a whole, the "Report on the Mining and Metallurgical Industries of Canada for 1907-8," issued early in the current year by the Mines Branch of the Canada Department of Mines, gives (p. 934) the following brief summary:—

"The annual output throughout Canada is now more than 10,000,000 short tons, of which about 60 per cent. is mined in the Maritime Provinces and 40 per cent. in the Western Provinces. The total output in Nova Scotia since 1785 has been about 83,000,000 gross tons, and in British Columbia since 1836 about 28,000,000 gross tons. In the Northwest Territories there has been mined since 1887 about 8,500,000 gross tons. There is, therefore, a total output on record to the end of 1907 of nearly 120,000,000 gross tons. At the present rate of production, as much more will be mined during the text ten years.

"The coal fields of Canada are not found in proximity to the centres of population. The Province of Ontario—the most populous province of Canada—has no coal deposits, hence the consumers of coal in this province find it more convenient and profitable to import their coal supplies from the nearer fields of Pennsylvania and Ohio, U.S.A.

"From 2,000,000 to 2,500,000 tons, or about 30 per cent. of our imported coal, is anthracite, which is not found in Eastern Canada. For similar geographical reasons it is probable that upwards of 20 per cent. of the total production of bituminous coal in Canada finds a market in certain northern parts of the United States.

"Our imports of coal aggregate about four times as much as we export, hence our consumption of coal is considerably greater than the amount mined in Canada. In 1906 our consumption of coal was estimated at 15,326,466 short tons, or nearly 60 per cent. greater than the production, which amounted that year to 9,782,601 short tons."

The foregoing review was written before the question of reciprocity in coal between the United States and Canada was once more brought into public notice. In connection with the last paragraph above quoted it may be mentioned that "The Coal Trade" for 1909 (published by the editor of "The Coal Trade Journal," New York), says concerning Canada's fuel imports:—

"During the fiscal year ending June 30, the imports of fuel into Canada were as follows:—

|                       | 1905.     | 1906.     | 1907.      | 1908.      |
|-----------------------|-----------|-----------|------------|------------|
| Receipts.             | Tons.     | Tons.     | Tons.      | Tons.      |
| Bituminous .          | 4,826,535 | 5,516,019 | 6,714,311  | 6,710,933  |
| Anthracite .          | 2,604,137 | 2,200,863 | 2,784,161  | 3,296,522  |
| Coke . . . .          | 371,593   | 480,222   | 557,842    | 565,273    |
| Bitum. dust . . . . . |           |           |            | 1,139,233  |
| Totals . . .          | 7,802,265 | 7,197,104 | 10,056,314 | 11,711,961 |

"Under the general tariff of Canada the duty on bituminous coal is 63 cents per net ton, and on bituminous dust, or slack, and upon charcoal, 14 cents per ton. There is no duty imposed upon anthracite or coke."

The opinion may here be offered that it is a matter for much surprise that when it came up lately there was so little public interest shown in this matter, though the explanation of the seeming indifference of the comparatively large coal-producing interests of the West and the larger body of consumers in Ontario and Manitoba may be attributed to doubt as to whether the United States would consent to the abolition of all duty on coal, provided that Canada would act similarly. But since the question is not one for the present only, but must increase in importance as the great coal resources of the Dominion become further developed, it is desirable that the views of men in positions to speak with more or less authority regarding it, be taken note of, and this notwithstanding that there appears no present prospect of reciprocity.

#### Some Production and Report Figures.

Before quoting recently given expressions of opinion of several well-known men, though, a few more production figures will be submitted, and, too, some notes concerning development in established western coal fields, and prospects in others known but not yet producing coal for market.

#### Coal Production in Alberta, British Columbia and Nova Scotia for Five Years, 1904-1908.

| Year.          | Alberta.<br>Short tons. | Brit. Columbia.<br>Short tons. | N. Scotia.<br>Short tons. |
|----------------|-------------------------|--------------------------------|---------------------------|
| 1904.....      | 728,931                 | 1,862,625                      | 5,596,241                 |
| 1905.....      | 811,228                 | 1,945,452                      | 5,646,583                 |
| 1906.....      | 1,385,000               | 1,955,000                      | 5,840,000                 |
| 1907.....      | 1,834,745               | 2,365,000                      | 6,354,000                 |
| 1908.....      | 1,845,000               | 2,362,000                      | 6,540,000                 |
| Totals . . . . | 6,604,904               | 10,490,077                     | 29,976,824                |

The above tonnages are gross, i.e., inclusive of coal made into coke.

#### Coal Production in Pacific Coast States for Five Years, 1904-1908.

| Year.         | Washington.<br>Tons. | Oregon.<br>Tons. | California.<br>Tons. | Alaska.<br>Tons. |
|---------------|----------------------|------------------|----------------------|------------------|
| 1904.....     | 2,905,689            | 111,540          | 79,582               | 1,694            |
| 1905.....     | 2,846,901            | 109,641          | 80,824               | 3,774            |
| 1906.....     | 3,290,523            | 79,731           | 30,831               | 5,541            |
| 1907.....     | 3,722,434            | 70,981           | 24,089               | 10,139           |
| 1908.....     | 2,977,490            | *70,000          | *20,000              | *30,000          |
| Total . . . . | 15,743,037           | 441,893          | 235,326              | 51,148           |

\*Estimated.

No information is at hand relative to the quantity of coal shipped from Alberta to the United States, but the following figures give, in long tons, that from British Columbia for five years, 1904-1908: In 1904, 532,436 tons; 1905, 673,700 tons; 1906, 679,829 tons; 1907, 651,076 tons; 1908, 567,274 tons; total, 3,104,315 tons, or nearly one-third of the gross production. Adding that used in making the coke also shipped to that country, it is found that about 39 per cent. of British Columbia's gross output of coal for the last five years, notwithstanding the customs duty charged against it, was exported to the United States. The interest of



Western Canada in the question of reciprocity in coal is, therefore, very evident, especially since no very great increase in demand for coal may reasonably be expected from Canadian territory accessible at freight charges that are not prohibitory to a profitable coal trade.

It may here be mentioned that "The Coal Trade" gives the following as the tonnage of coal exported from British Columbia to San Francisco, California, during five years, 1904-1908: In 1904, 335,137 tons; 1905, 348,515 tons; 1906, 311,099 tons; 1907, 205,956 tons; 1908, 167,415 tons. It says further: "Of the three Pacific States, Washington is the only one producing a large amount of coal. Coal fields in this State are conveniently located with regard to the chief centres of population, and while the coal is of fair quality, there is nevertheless the opportunity for the importation of coal from the adjacent Canadian Province of British Columbia. This coal finds a market in Seattle and Tacoma and the vicinity thereof, despite importation duty, but naturally cannot stand rail freight to the interior, save in the case of that going all-rail to Spokane. The superiority of the British Columbia coal is also a factor tending to restrict the shipment of Washington coal to San Francisco, for, despite greater length of voyage, British Columbia coal is delivered in San Francisco in greater volume every year than is the coal from Washington."

#### Coal Mining in British Columbia.

The Provincial Mineralogist for British Columbia, in his review of coal mining in the Province in 1908 (vide "Report of Minister of Mines, 1908," pp. 194-195), says in part: "The coal mines of the Province have, for many years, been sufficiently developed to supply the domestic demand, and they, therefore, have had to look to the export market to increase their sales; unlike the metalliferous mines, whose product is taken to the market to be sold, the coal mines must wait until the market comes to them, or within their reach. The market for coal is, therefore, directly dependent upon, and in proportion to, the industrial activity of the district supplied. . . . This enlarging of the market must necessarily be gradual in a new country—and all the Pacific Coast is industrially new—but that an increase has taken and is taking place, a glance at the coal statistics will show. This increase has been fairly regular amounting to an average yearly increment of between 50,000 and 60,000 tons of coal, while at the same time, in ten years, the annual output of coke has increased from 35,000 to 247,000 tons, due to the growth of a special industry, viz., ore smelting."

Of new producers of coal in the Province, and of coal exports, the same official says: "The Hosmer colliery, in East Kootenay, began shipments in December of 1908, and while its actual production, having been but for one month of the year, was small, its development and equipment have placed it among the large mines, and it will have to be reckoned with next year."

"The colliery of the Corbin Coal & Coke Company, in the same district, also began shipping regularly during the year, making a small output, and, although not so extensively developed nor equipped as the Hosmer mines, may be counted upon for a very much larger production in the near future."

"In the Nicola Valley section of the Coast district the Middlesboro colliery, which was only opened last year, has this year shipped 26,000 tons of coal, and its output might have been doubled with more favorable freight rates to the Coast."

"On Vancouver Island, the Fiddick colliery, also opened last year, has produced 17,000 tons of coal, chiefly from development workings, and next year, when it will have its own railway to salt water and shipping facilities, its output will be much greater. Two other collieries on the island made small shipments, viz., the Gilfillan and New East Wellington collieries, but these have not as yet become important factors in the coal output.\*

"The available supply of coal in the Province seems to be unlimited, particularly in the Rocky Mountain coal field, in which might be included several coal mines in Alberta, just over the provincial borders, and it would seem that the Province controls the coal situation of the whole Pacific Coast, since the quality of the coal found on the coast to the south of the international boundary line is admittedly of inferior quality."

"During the year about 37.5 per cent. of the total coal sold from British Columbia mines was exported to the United States; the export trade to other countries was insignificant, having been less than 2 per cent. of the total sales. The collieries of the East Kootenay District exported to the United States about 57 per cent. of the coal they sold, while the coast collieries exported to that country about 30 per cent. of theirs. Formerly, in 1902, the coast collieries exported to the United States 75 per cent. of their coal, but the percentage exported since then has been gradually diminishing, owing to an increasing home market and to the use in California of crude oil as fuel."

#### Alaska a Probable Competitor.

It must be expected that ere long Alaska will become a competitor with British Columbia for the coal trade of the Pacific Coast States, and this is already recognized by those familiar with the extent and the promising nature of the coal fields already discovered in that country, in some of which there is coal in considerable quantity and of superior quality. The following significant reference to these fields is made in the "Mineral Resources of the United States" (Part II., p. 95): "The Alaskan coal fields, particularly those carrying a high-grade fuel, like the Controller Bay and Matanuska, are destined to play an important part in the advancement of industry on the entire Pacific seaboard of the North American continent. Their early opening up is a vital question to all residents on the Pacific." It is, therefore, apparent that Alaskan coal, as well as Californian fuel oil, may be expected ere long to curtail seriously the market for British Columbia coal on the Pacific Coast, hence the greater necessity for the advocacy by Canadians of the removal of all trade restrictions.

#### Coal in East Kootenay and Alberta.

Turning now to the Crow's Nest Pass coal field, and to other large areas northward and eastward, respec-

\*Note.—The Provincial Mineralogist also mentions, on pp. 198-9, a number of "prospective coal mines," of which the following is a summary: In East Kootenay, on the upper Elk River and Flathead River; in Similkameen, near Princeton, and on Granite Creek and Collins Gulch; in Nicola Valley; on Vancouver Island and neighboring islands in the Straits of Georgia; and in Skeena District, on Telkwa, Zymoetz, and upper Skeena Rivers. Then, too, there are occurrences of coal on Graham Island, of the Queen Charlotte group, while coal is reported as also having been found in the Peace River country, within the Boundaries of British Columbia.



tively, from that very important field, the following notes are submitted. While comparatively little is yet definitely known about coal in the Flathead section of Southeast Kootenay, the position is somewhat different concerning the country extending 100 miles north of that in which the producing mines of the Crow's Nest Pass are situated. In the vicinity of the upper Elk and Fording Rivers, including the area known as the Green Hills field, prospecting has disclosed the occurrence in these localities of much workable coal, which is only awaiting the provision of railway transportation facilities to make it available for marketing. In regard to size of seams and quality of coal, this part of the Province promises to take a leading position whenever the utilization of its immense coal resources shall be undertaken. In the Alberta extension of this field and, as well, southward from present collieries having connection with the Crow's Nest Railway, there are coal measures that, in many places, give promise of proving productive. About Lethbridge, in the prairie country, too, there is much coal, to work which more extensively old collieries are being provided with modern mining and handling equipment, and new enterprises are being established. And for much of the coal—probably for by far the greater part of it—a market will have to be found south of the international boundary line. So here, too, the question of reciprocity in coal will soon become a very important one.

The very large area of the fields and the enormous quantity of coal they are estimated to contain are probably not known to the general public. For the "Mineral Industry" (to the end of 1908, p. 200) the late Dr. George M. Dawson, for some years prior to his death the Director of the Geological Survey of Canada, wrote: "This (Crow's Nest) coal field, although it has not yet been fully defined, must have an area of at least a couple of hundred square miles. . . . It is already manifest that we have here one of the most remarkable coal basins known. Dr. Selwyn roughly estimated the coal underlying each square mile, in one part of the field, at 49,952,000 tons." (Annual Report, Geological Survey, Vol. V., N.S., p. 14 A.)

Later explorations by the Geological Survey have led to the discovery of other very important occurrences of coal, situated approximately 200 miles north of the Crow's Nest area. Of certain localities in the Cascade basin, D. B. Dowling, also of the Geological Survey, said recently (see "Summary Report of the Geological Survey, 1908," p. 79): "The number of seams discovered, as well as the undisturbed position of the measures, assures a very large total of mineable coal. . . . Assuming that where the whole thickness of measures is present there is an average of 90 feet of coal capable of being mined, the available coal amounts to 150,000 tons to the acre, or 90,000,000 tons to the square mile. For the average of the area as mapped, allowing for dirty seams and coal left in the mine, approximately 65,000,000 tons should not be an excessive estimate."

In further indication of the enormous quantity of coal available in this part of Canada, it may be mentioned that Mr. Dowling, in a report published by the German Development Company, Limited, of Ottawa, Ontario, gave as his estimate of tonnage of coal contained in three areas selected for the company, that so far as prospected, it would "show at the very least a total of 279,000,000 of tons," and in the same company's Kananaskis area his approximation was about 500,000,000 tons, while Mr. James McEvoy, formerly of the Geological Survey, estimated the last-mentioned area to contain "519,750,000 tons, of which 75 per cent. can

be actually taken out, or 4,000 tons a day for over 320 years."

Mr. McEvoy's estimate of coal in the German Development Company's Bighorn area, in Alberta, is 124,618,000 tons, of which 85 per cent. can be actually taken out—nearly 106,000,000 tons, or 2,000 tons a day for more than 175 years. For its Brazeau area, in the same province, he estimates a total of 198,000,000 tons, 85 per cent. of which 168,300,000 tons or say 4,000 tons a day for more than 140 years, can be extracted.

The foregoing estimates are here quoted with the object of giving some idea of the enormous quantities of coal available in the parts of Western Canada mentioned, not as in any way showing the total extent of the coal resources of this part of the Dominion. They should serve, too, to impress those who read them with some conception of the importance to Western Canada of securing, if possible, reciprocity in coal. In this connection, that is, as regards area of coal lands, it may be of interest to point out that in a bulletin published by the United States Geological Survey it is stated (after mentioning an area of about 484 square miles in Eastern Pennsylvania, and two small areas in the Rocky Mountain region underlain by anthracite coal), noting the several bituminous fields in the United States, that: "By far the most important of these in production is the Appalachian field, which includes the areas in Western Pennsylvania, and in Ohio, Maryland, Virginia, West Virginia, Eastern Tennessee and Kentucky, Georgia, and Alabama. In this region an area of 70,807 square miles is underlain by coal. Next in importance is the Central field, which comprises 58,000 square miles. The western coal field, the third in productive importance, contains 94,076 square miles. The Rocky Mountain field is the largest in area, comprising more than 100,000 square miles."

#### Reciprocity from Different Points of View.

Naturally, this question is unfavourably or favourably viewed, according to the effect reciprocity in coal would have upon the various interests directly concerned. In its "Coal Trade Review" of June 26, the New York "Engineering and Mining Journal" (p. 1309) stated the position fairly correctly in comparatively few words. It said:

"Many Pennsylvania shippers favour such an arrangement because they have a large trade with Canada; but West Virginia men are opposed because they are cultivating the New England trade, and do not want to come into competition with Nova Scotia coal. A similar local division exists in Canada itself. Nova Scotia miners are opposed to reciprocity, fearing to lose Canadian trade; Ontario favours it as a means of getting cheaper coal; while British Columbia also favours it owing to its large trade on the Pacific Coast." The last statement presents the case only in part, for of 567,274 long tons of coal and 37,314 tons of coke exported from British Columbia to the United States in 1908, 266,829 tons of coke were shipped to that country from the Crow's Nest Pass district, and none of this latter went to U. S. Pacific Coast points. The big market for coal and coke from Southeastern British Columbia and Southern Alberta will in the future be in Eastern Washington, Idaho, and Montana. It is quite probable exports to the Northwestern States of coal and coke from the Canadian fields just mentioned will steadily increase from now on, especially after additional railway connections shall have been established, as they most assuredly will be ere long. Reciprocity or no reciprocity, more Western Canadian coal and coke will find



a market in the states named, and this for two chief reasons—one, it will be the most accessible source of supply, and, two, the quality of fuel obtainable is excellent and probably better than from other fields seeking to supply the same market.

It is not the purpose of the writer to present here at length the views of those who are opposed to reciprocity from the standpoint of the coal mine operators of the Maritime Provinces. Only brief reference will be made to two published press despatches, both from Montreal, dated March 18, 1909. One was to the Toronto "Globe," and purported to give the view of the Dominion Coal Company, which was, in substance, that owing to labor costs being 50 per cent. higher at Cape Breton coal mines than at those of West Virginia, the former could not compete with the latter in the New England markets; further, that it would take the Dominion Coal Company at least three years to provide adequate terminal facilities at Boston and elsewhere, by which to handle the New England coal trade, and that the New England markets must be absolutely assured to the Dominion Coal Company for at least 20 years, or its losses on its St. Lawrence investments and the large outlay requisite in New England ports would together ruin its credit. Now, it does not necessarily follow that the whole of the St. Lawrence trade would be lost to the Dominion Coal Company, even if reciprocity were arranged. The statements of a Dominion Coal Company official made about two years ago (see "Journal of the Mining Society of Nova Scotia," pp. 92-95) may be regarded as throwing some light on this question. Space restrictions prevent these being here quoted in full, so only two will be reprinted: "We are selling coal in Montreal to the Grand Trunk and Canadian Pacific Railways at \$2.75 delivered. . . . We can discharge coal in Montreal at the rate of 1,000 tons an hour at a cost of less than 10 cents a ton." The whole discussion, as printed in the journal mentioned, is, however, of much interest at this time.

The second news despatch now under notice appeared in the Vancouver, B.C., "News-Advertiser," and it was represented to be the views of F.L. Wanklyn, vice-president of the Dominion Coal Company, as stated to the Montreal "Star," and of W.E. Muir, local sales manager of the Nova Scotia Coal and Steel Company. Both gave various reasons against reciprocity. The former was represented to have said that "if reciprocity were established it would only be a short time before the whole of Canada would be flooded with American coal, and the Canadian production would be extinguished," and the latter was strongly of the opinion that reciprocity would soon completely destroy the Canadian coal-producing industry. It may be that the statements of those gentlemen were not nearly so comprehensive as alleged; possibly they said "of the maritime provinces," not "of the whole of Canada." But if the latter, well, they may well be reminded of the now historic utterances of certain other persons who are known as "the tailors of Tooley Street." It does not appear to be a rash prophecy to assert that in the course of a very few years more coal will be produced in western Canada than in eastern, and that the proportion will steadily grow in favour of the west.

In contrast to the alarmist opinions of the gentlemen just quoted may be placed these of Mr. D.D. Mann, the well-known railway builder, who said in Victoria, B.C., two months ago: "I cannot, at the moment, think of any considerable manufacturing advantage that would be sacrificed by a readjustment of the coal tariff. There are some conditions surrounding the mechanical pro-

duction of coal in Nova Scotia which would, I think, adjust themselves by the opening of the New England market. I have reason to know that the Pennsylvania coal interests would not object to the change. What they would lose in Boston they would gain in Montreal and Ontario. For, let this be observed—the present tax on United States coal hits the consumer back of lakes Ontario and Erie, even though he cannot possibly buy other than Pennsylvania coal. Undoubtedly the duty restricts the consumption. Remove it and the consumption would increase. On the other side of the continent similar conditions prevail. There is unlimited coal in British Columbia and Alberta, and very little and that of poor quality, in the Pacific States. A duty on Canadian coal is a tax upon industry in the near-by states, without any compensating advantage to either side of the line. A glance at the map of the North America will show, I think, that the providential distribution of coal is such that it might wisely be left to work out its own solution of supply and demand. In any case, the ultimate disposal of it will be determined, not by the accidents of any tariff, but by how long the supply endures."

Before turning to western Canadian opinion, it may here be mentioned that readers of the Canadian Mining Journal will already have been made familiar with opposing eastern views as stated in its special correspondence from Glace Bay, N.S., published on May 15 and the letter of the secretary of the Free Coal League, which was printed in its issue of July 1.

#### From the Western Standpoint.

The following editorial comment on "What Free Coal Would Mean," appeared in "The Evening Post," Victoria, B.C., on April 14, last. The writer, Wm. Blakemore, is a coal mining engineer well known in eastern Canada as well as in the West. He wrote:

"Up to a week ago, it was considered there was an excellent chance of securing reciprocity in coal with the United States, but at the last moment the deal slipped up, and for another indeterminate period coal remains on the dutiable list, with a few cents' reduction only. The subject is not likely to become a live issue for several years, at any rate, although it is probable that conditions will force it to the front before the next general revision of the tariff. The real reason the advocates of free coal were defeated is because Canada stood to get the best of the bargain, and that was sufficient to enable the big coal operators of Pennsylvania and Ohio to kill the proposal.

"The natural conditions governing the interchange of bituminous coal between the two countries are somewhat peculiar. Canada has a large coal field in Nova Scotia, producing, in round figures, 6,500,000 tons a year. Between the Maritime Provinces, and almost to the Rockies, there are no deposits of bituminous coal; but in Western Alberta and British Columbia there is a production which has rapidly increased during the last ten years until it now approximates 5,500,000 tons. The total exportation of Canadian coal in 1908 is estimated at a little less than 2,000,000 tons, showing that 9,000,000 tons of native product is consumed within our own borders. The geographical position of the two great producing centres, upon the Atlantic and Pacific Coasts, imposes a limit upon the area within which it is economically possible to distribute the product; that limit may be placed at Montreal with reference to the Nova Scotia coal, and at Winnipeg for the Western. Between these points, distant nearly 2,000 miles, and including the whole of



the populous Province of Ontario, the market is supplied exclusively by American coal, which was imported during 1908 to the extent of 7,500,000 tons.

"The crux of the question depends on the extent to which distribution will be affected by the abolition of the 67-cent-duty. According to expert opinion, it could only work to the advantage of the Dominion, because natural conditions have determined that American coal must dominate the central district described, duty or no duty, and free coal would not increase the consumption within that area faster than would result in any event from the ordinary increase in population.

"In Nova Scotia, which already exports about 1,000,000 tons a year to the New England States, it is estimated that free coal would enlarge the market to the extent of at least half the consumption of those states; this would mean practically doubling the present production, and absorbing that much of the territory now served by the American producers. British Columbia and Alberta export, in round figures, 1,000,000 tons a year, and would export a great deal more, even in face of the duty, with better development, and increased transportation facilities. With the duty removed, the market for this coal would be extended a radius of at least 100 miles, and would yield a practical monopoly of the great smelting centres in Montana and Washington, to the Canadian product. Just what tonnage this would represent it is difficult to estimate, but since there is no high class coal in any of the Western States, the mere question of quality would carry the Canadian product into every market within, say, 600 miles of the International Boundary line. The tonnage consumed in such a vast district for smelting, steaming, and domestic purposes, already approximates to 10,000,000 tons a year, and is increasing by leaps and bounds. From this it will be seen that Canada has everything to gain and nothing to lose, by agreeing to reciprocal coal, but the beneficent project was defeated on both sides of the line by wealthy coal operators, who, not for the first time, have been able to impose their wishes upon the legislatures of both countries. The action of the American Senate has saved the Canadian Government from sharing the odium of the decision, but the more the people of Canada, and of the United States, study the question, the more they will realize the injustice of continuing a system which imposes an unnecessary tax upon one of the prime necessities of life. The protection of vested interests does not require a duty on coal, and the point will be reached when the public interests, clashing with that of the great Eastern coal operators in both countries, will force them to yield to the popular demand."

About two months ago J.D. Hurd, general manager of the Crow's Nest Pass Coal Company (which, by the way is not seeking customers for its coal, being unable to supply all demands made upon it, and having a prospect of continuance of a similar condition for some time to come) was interviewed in Victoria, B.C., by a representative of the "Colonist," which quoted him as having said relative to the proposed reciprocal arrangements:

"I think such an arrangement would work out to the best interest of the operators and consumer throughout Canada and the United States.

"Some years ago I was connected with the coal mining industry in Ohio, and at that time we shipped a large quantity of our product to Ontario and Manitoba. Such an arrangement would certainly be in the interests of Central Canada for there are no Canadian mines which would be affected by the free entry of

coal into that district. About 1896, I investigated the condition of the coal industry in Cape Breton and Nova Scotia generally. At that time the Dominion Coal Company was controlled by H.M. Whitney, of Boston, and he was seeking to obtain the free entry of coal into New England, largely in connection with his Bay State Gas company. But the fact remains that the natural market for a great deal of the coal of Nova Scotia is the New England States. The Nova Scotia coal is of a somewhat lower grade than that shipped to the coast by Pennsylvania and other centres and is used for different purposes. The free entry should not only benefit the Canadian shippers but the American consumers.

"The Nova Scotia consumers are somewhat jealous of their St. Lawrence market, but, as a matter of fact, I do not think that taking the duty off the American coal entering Canada at that point would affect them to any degree. More coal would enter, but it would merely be due to the increased industry in the lines using that class of the product.

"Here in British Columbia, while the proposition is a different one, it comes to the same thing. There are coal mines in Washington and Montana, but these are for the most part owned by different railway companies, such as the Great Northern, the Northern Pacific, the Union Pacific, and so on, and there will never be any individual producers of any great volume of coal for market. The railways use all the coal they mine, and will use more with the increase of traffic. The ordinary consumer must use British Columbia coal, and that is the outlet for our surplus product.

"With the duty removed and British Columbia coal going into the United States free, it will mean that the coal areas of the province will be developed more widely and the output will increase. It cannot militate against the local consumer. The rates will not go up. With increased production, the cost of that production is lowered and the consumer reaps part of that benefit. Any short-sighted policy, such as attempting to set an arbitrary, high price on coal works out its own solution, especially in a country with the vast undeveloped areas of British Columbia. Reciprocity would be a good thing for the consumers and the operators, both in Canada and the United States."

Representatives of the two coal mining companies who have for many years been operating on a large scale on Vancouver Island, and whose chief market has heretofore been San Francisco, California, were interviewed last March by newspaper representatives. A despatch received in Victoria at that time from Nanaimo, where the company's general manager, Thos. R. Stockett, has his headquarters, was as under:

"The management of the Western Fuel Company, interviewed regarding the possibility of the removal of import duties on coal passing between Canada and the States said that they believed that reciprocity in coal between the States and Canada would be a good thing for both countries. So far as British Columbia is concerned, it would tend to extend the field in the States where its coal could be marketed and inasmuch as there is no American coal imported into British Columbia, the removal of the duty by Canada could not have any effect on any of the existing industries here and particularly as British Columbia coals are of a high standard.

"The Western Fuel Company has been making a specialty of developing trade in British Columbia and is now marketing fully 65 per cent. of its output in this province. But in order to keep its mines working to



capacity it is obliged at present to seek any outlet in other countries and in the States is the only field available. The Company will welcome the day when its entire output can be marketed in British Columbia."

J.A. Lindsay, of Victoria, treasurer of the Wellington Colliery Company, who has been intimately associated with the Dunsmuirs in this and other large coal mining enterprises for years, said to the "Colonist":

"The consumer in either country would reap the benefit of the abolition of the duty on coal by Canada and the United States.

"So far the details received from Washington giving the terms of the measure as it applies to coal are too meagre to venture any very lengthy opinion upon the matter. The removal of the duty on coal imported into the United States would have the effect of stimulating the production of coal in the interior and on this coast. It would mean probably that new coal measures would have to be opened here and provide work for more men. It would also mean cheaper coal for the consumer in California, and that many people there who now use oil for fuel would return to the use of coal. The prices of the two products have gradually equalized themselves. The removal of the duty on coal entering the United States would not, I believe, increase the cost of coal to the consumer in this province. It would simply mean that more coal would be mined.

"On the other hand the removal of the duty on American coal entering Canada would prove a great boon to the Canadian consumer upon the prairies, in Ontario and in Quebec. Nearly all the coal used there is brought from the United States, from Pennsylvania and Virginia.

"The Nova Scotian producers have generally opposed the proposal to abolish the duty on coal entering Canada. It is difficult, however, to understand their point of view. They export a large quantity of coal to the New England States and little of their product is used in Upper Canada. They would benefit immensely more under the reciprocal arrangement, I should think, than they would suffer.

"The coal fields of Canada and the United States are not active competitors. Nature has placed coal on this coast and none in California; coal in the Crow's Nest district, none in the rich copper mining camps to the immediate south of that district; coal in Pennsylvania and none in the central provinces of Canada; and coal in the Maritime Provinces and none in the New England States. The conclusion is obvious. Free interchange must benefit the consumer since it will tend to reduce the cost of production and as well, the cost to the consumer."

As coal mine owners in Western Canada are believed to be unanimous in the opinion that reciprocity in coal would greatly benefit the coal mining industry of the West, there does not appear to be any present necessity to seek the views of others than those quoted, especially, as the latter are representative of the largest operators in the two chief coal producing districts of British Columbia, the Crow's Nest Pass and Vancouver Island, respectively. It is known that at least one operator in the adjoining State of Washington has expressed himself favourably towards reciprocity, but it must be expected that most of the mine owners in that State selling coal to the public will support continuance of the existing duty, especially in the admitted circumstance that British Columbia coal is of much better quality than the bulk of that mined in Washington.

Eastern Washington and Idaho, on the other hand, will co-operate to secure the removal of customs duty

on coal, for they look to the Crow's Nest Pass mines; and those of the adjacent parts of Alberta for their chief supply of coal. In this connection it may be noted that James J. Hill, chairman of the board of directors of the Great Northern Railway, addressing a number of the business men of Spokane, a city of about 100,000 people and the inland capital of the State of Washington, said to them last November: "One of Spokane's greatest needs is cheap coal. There are no extensive coal fields nearer than British Columbia. Coal coming into the United States carries a duty of 67 cents a ton. Get that removed and good domestic coal can be delivered in Spokane in carload lots for less than \$5 per ton. It should be retailed at \$1 profit, which would make coal here \$6. Cheaper coal than at present is absolutely necessary for the development of manufacturing. Spokane is getting too big to burn pine slabs."

Much similar advocacy of reciprocal arrangements for free coal might be added, but more than enough has been written and quoted to indicate that, far from being disposed of by the recent decision of the United States legislature to maintain a comparatively high duty on coal, the question has not yet been widely nor actively taken up. It is hoped the foregoing information will in some measure prove of service to those who shall sooner or later undertake a persistent campaign in favour of free coal for both Canada and the United States.

#### THE BRITISH MINT ANNUAL REPORT.

The thirty-ninth annual report of the Deputy-Master and Comptroller of the Mint for the year 1908 was published on July 7th.

It sets forth that the demands for Imperial coins exhibited a considerable decline. About 92 millions of such coins were struck, a fall of over 36 millions from 1907. The number of coins struck for colonies showed an increase over the previous year. In all nearly 126½ million pieces were struck in the operative department, of the value of 15½ million pounds.

Gold bullion, weighing 2,171,962,178 ozs standard, of the value of £8,457,077 14s 7d, was imported into the Mint for coinage during the year. The value of light gold coin received for recoinage was £3,300,000, and its weight 838,463,890 ozs.

The gold coin issued during the year was as follows: Sovereigns, £12,600,000; half-sovereigns, £2,000,000—total, £14,600,000.

New gold coin was received at the Bank of England from Australia during 1908 amounting to £593,150. The total amount of light gold coin received from the Bank of England during the year was £3,300,000.

The gold coins received and weighed at the Bank of England during the year amounted to 54,553,704 pieces, as compared with 53,233,708 in 1907, and the percentage of light, both in sovereigns and half sovereigns, the latter more particularly, was higher than in the previous year. The increase in the amounts of sovereigns accepted as light still continues, and the large number of half sovereigns withdrawn in 1907 and 1908, due to the large issues made in 1892-1893, is in accordance with expectation.

The silver coin issued during the year amounted to £815,397 (exclusive of Maundy money) as against a total of £2,019,471 in 1907. The denominations of the silver coinage were half-crowns, 210,020; florins, 266,850; shillings, 142,342; sixpences, 117,170; threepenny pieces, 79,015.



The total number of silver coins issued during the year (excluding Maundy money) was 18,203,500, as against 37,255,570 in 1907. Of these the number issued for circulation in the United Kingdom was 7,155,200, comprising 2,969,360 of the larger denominations (2s 6d, 2s), and 4,185,840 of the smaller (1s, 6d, 3d), or 41.50 and 58.50 per cent. respectively.

The issue of Imperial bronze coin in 1908 reached the total of £155,580, a falling off of \$71,970 from the large issue of the previous year. Particulars of each denomination issued are given below:—

| Denominations.      | Wt. (tons). | No. of pieces. | Value.   |
|---------------------|-------------|----------------|----------|
| Pence . . . . .     | 282.2       | 30,345,600     | £126,440 |
| Halfpence . . . . . | 64.9        | 11,644,800     | 24,260   |
| Farthings . . . . . | 13.1        | 4,684,800      | 4,880    |
| Totals . . . . .    | 360.2       | 46,675,200     | £155,580 |

The amount issued in the United Kingdom, £138,135, was distributed as follows: £510 to the Bank of England, £45,545 to London applicants and £92,030 to the provinces. The shipments to the colonies amounted to a total of £17,445. The smaller issues are accounted for by the contraction in trade.

### CANADIAN PATENTS.

Below will be found a list of patents issued by the Canadian Patent Office on July 6th, 1909, relating to mining and metallurgy, and furnished by Fetherstonhaugh & Co., Ottawa, Russell S. Smart, Resident.

119220. W. Scheurmann, Newark-on-Trent, England, air and gas pumps.

119222. J. J. Manning, J. W. Stephenson, Toledo, Ohio, methods of making castings, National Malleable Castings Co.

119,240. A. G. Betts, Troy, N.Y., processes of treating arsenical ores and speisses.

119257. J. C. Clancy, N.Y., treatment of ores bearing precious metals.

119259. W. H. Connell, Pittsburg, Pa., manufacture of compound ingots.

119260. T. H. Crittall, Bramtree, Essex, Eng., machinery for manufacturing expanded metal.

119282. E. W. Wynne, Liverpool, Eng., refining petroleum oil.

119321. D. W. Rowlands, Minersville, Pa., drills.

Below will be found a list of patents issued by the Canadian Patent Office on June 29th, 1909, relating to mining and metallurgy, and furnished by Fetherstonhaugh & Co., Ottawa, Russell S. Smart, Resident.

119107. W. H. Robson and H. J. Stobart, Stafford, Eng., vapour burners, The Chance Bros., Ltd.

119109. J. Noad, East Ham, Essex, Eng., the treatment of hydrocarbon oils and the like for the production of volatile spirit, Patent Hydrocarbon, Ltd., London, Eng.

119110. C. T. Snedeker, Chicago, Ill., processes for softening mineral bearing ores, C. T. Snedeker, W. E. Fry.

11958. G. L. Fogler, Pittsburg, Pa., processes of reducing ores, Fogler Heat & Reduction Co.

119184. Solomon Frank, Frankfort-on-the-Main, Germany, methods of treating zinc.

119188. H. H. Hughes, Springfield, Mo., revolving furnaces for volatilizing ores.

119192. J. F. Monnot, New York City, apparatus for producing compound metal bodies.

### GOVERNMENT VALUATION OF COAL LANDS.

In the year 1906 the United States Government withdrew from sale 66,000,000 acres of public coal lands. Previous to that year such lands had been sold for \$10 or \$20 an acre, according to their distance from a railroad. A presidential order provided that henceforward coal lands should be classified and evaluated by the U. S. Geological Survey.

The scheme of valuation determined by the Survey is as follows: Anthracite and coking bituminous coals are valued at 2 to 3 cents per ton. High-grade non-coking coals are valued at 1 to 2 cents per ton. High-grade sub-bituminous and low-grade bituminous coals are valued at ½ to 1 cent per ton. Low-grade sub-bituminous coals and lignites are valued at the minimum price fixed by law—\$10 and \$20 per acre. The tonnage is conservatively estimated at figures that should always be exceeded by actual recovery.

Provision is made whereby the price of coal lands may be increased for special reasons.

## BOOK REVIEWS.

**Handbook for Field Geologists.** By C. W. Hayes, Ph.D., Chief Geologist, United States Geological Survey. Second edition, thoroughly revised, 150 pages, 18 figures. Morocco, \$1.50 net (6 6 net). John Wiley & Sons, New York—Renouf Publishing Co., 61 Union Avenue, Montreal, 1909.

As Dr. Hayes puts it, this book is intended "to insure thoroughness and system, not to relieve the observer of the necessity for thought."

Part I., entitled "General Instructions," is a précis of the requirements, preparations, equipment, and methods of field geology.

Referring to the qualifications that a field geologist should possess, Dr. Hayes writes thus: "The first qualification is a good physique and a strong constitution. . . . The second is adaptability. Few occupations

present so wide a diversity in conditions under which work must be carried on. . . . His surroundings may vary all the way from the luxuries of a summer resort hotel to the bare necessities that he can pack on his back, and he must be able to adapt himself with equal readiness to either extreme. . . . A geologist must possess a practical knowledge of horsemanship, of boating, and of general woodcraft, so that he will be equally at home in the saddle, in the canoe, or on foot in a trackless forest."

Special academic training is also a necessity. Dr. Hayes defines geology, not as a special science, but as the application of a number of special sciences to the solution of a particular class of problems. The best preparation, therefore, is a thorough grounding in the fundamental sciences, particularly chemistry, physics, zoology, and botany. Mathematics and modern languages are also essential.



"Second in importance only to a thorough grounding in the physical sciences," says Dr. Hayes, "is ability to write clear and concise English." Here we can hardly agree with the author. Surely ability to write well in English is as essential, if not more essential, than any other requirement.

Good advice is given on page 5, touching the relation of the geologist to the public. It is generally advisable to take the necessary time and trouble to explain to any one making serious inquiry exactly what is the object of the work. . . . The opportunity to educate the people of a region in which work is being done to an appreciation of the nature and importance of geologic surveys should be utilized so far as possible."

Preparation for field work is next touched upon. General directions for attacking different kinds of field work are given. Next, the field output is inventoried. This section is practical and instructive. The mint ration adopted officially by the U. S. Geological Survey is printed in full. Field observations, measurements of various kinds, determination of faults, are described and illustrated. Methods of making field notes, sketches, traverse notes, and so on, and directions as to the use of chemical analyses, mine surveys, and mineral collections, are noted fully.

In Part II., after general summaries of field observations to be made by the geologist in igneous, sedimentary, and metamorphic rocks, on structural geology, on glacial deposits, and on oil and gas fields, twelve exhaustive schedules appear. These are intended to guide the geologist in securing completeness and system in making and recording observations. The first four schedules have to do with pure geology, the remainder with applied geology. Together they constitute an invaluable guide, the matured result of experience and discussion.

An appendix contains a list of official surveys relating to all parts of North America.

Seldom has it been our good fortune to review so useful a little volume as this "Handbook for Field Geologists." Its usefulness should not be confined to professional geologists. It should be in the hands of all mining men and all investors. It would thus become an invaluable link between the public and that much-misunderstood person, the field-geologist.

**Through the Yukon and Alaska.** By T. A. Rickard, Editor of the Mining and Scientific Press and The Mining Magazine. 175 illustrations, \$2.50 postpaid. Mining and Scientific Press, 667 Howard Street, San Francisco, 1909.

This is the record of a journey through Yukon Territory and the District of Alaska during the summer of 1908, of "the pleasures and tribulations of a voyage of 8,250 miles, in the course of which 18 different vessels were boarded, and 18 different kinds of canned vegetables were broached."

The volume is dedicated charmingly and touchingly to Mr. Rickard's small son, John. We shall not refrain from quoting the last verse:—

"God give you grace and make you strong  
To rise above all meaner things;  
And be your life as sweet a song  
As that your mother sings."

Written for the general reader, "Through the Yukon and Alaska" is non-technical throughout. Nevertheless, its pages are profitable for technical and non-

technical readers alike. Interesting bits of history are interwoven through the narrative. The reader is treated to vivid descriptions of scenery, mining camps, living conditions, river travel, and all the distinctive features of existence in the far North. The author's direct, vivid, nervous style carries us swingingly from chapter to chapter. Every chapter gives fresh evidence that Mr. Rickard enjoyed the journey hugely, and every chapter is superbly vital.

A lesser man, we doubt not, filled to supersaturation with the charm and majesty of the North, would exude superlatives and dithyrambs. But Mr. Rickard, barring one or two flights into rhetoric, has held himself well in hand.

In manner, matter, and arrangement "Through the Yukon and Alaska" is the best of Mr. Rickard's literary offspring. It possesses coherence. It shows evidence of sustained care and shrewd workmanship. The author's style is not exuberant; neither is it meagre. Nor is it studiously balanced. It is simply and spontaneously natural—the pleasant product of good taste, keen observation, and enthusiasm.

**The Canadian Annual Review of Public Affairs—1908—**  
by J. Castell Hopkins.. Eighth year of issue—illustrated—The Annual Review Publishing Company,  
Toronto—1909.

This volume is an improvement upon its predecessors. Dominion public affairs are interestingly sketched. Political movements, provincial developments, transportation interests, financial and insurance conditions, literature, journalism, art, and many incidental of the year are treated.

Considerable space is assigned to the mining industry. This we are glad to note.

As a summary of the history of Canada for the past year, Mr. Hopkins' volume has a distinct place. It should be read by everyone.

#### PERSONAL AND GENERAL.

Messrs, Moore and Scollan have opened an office at 43 King St. W., Toronto, for the purpose of carrying on their business as power engineers.

Mr. S. B. Belden has been promoted to the position of Sales Manager in the Mining Machinery Department of The Jeffrey Mfg. Co. with headquarters at Columbus, O. Mr. Belden, who has for a great many years been manager of the Pittsburg Office of the Jeffrey Company, succeeds in this position Mr. R. G. Hutchins, Vice-President, whose resignation has recently been accepted.

The following appointments have been made to the Staff of the Nova Scotia Technical College, Halifax, N. S. :

To be Professor of Civil Engineering: Mr. T. S. Hewerdine, A. B., S. B., C. E., University of Illinois. '04, Professor of Mathematics and Civil Engineering at McKendree College, Lebanon, Illinois.

To be Professor of Electrical Engineering : Mr. R. R. Keely, E. E., M. M.E., Cornell, '00, for the past three years Chief Engineer of the City of Edmonton, Alberta.

To be Instructor in Mining and Metallurgy: Gerald F. Murphy, B.Ce., in Mining Engineering, Dalhousie College, Halifax, who, for the past year, has been tak



ing a post graduate course in Mining at Columbus University, New York.

Mr. R. W. Brock, in a recent paper before the Canadian Mining Institute, emphasizes the need of a connecting link between the prospector and the purchaser, and advocates the filing of statements by the staker, corroborated by an assayer or engineer at mining recorders' offices, local institutes and boards of trade. All of this should be arranged on some scheme to avoid expense to the prospector. Where there is an opening some firm will soon seize the opportunity, and this has been done by "Mines Inspection, Limited." They have started their career with the Gowganda camp, making reliable reports, not only affording capital a systematic means of doing business, but also helping the prospector with advice as to the value of his property, and helping to develop his claims. It can readily be seen that the benefit that will accrue to the company will be the information thus gathered. At present they are contracting for mining work, and are selling claims, thus meeting their current expenses.

## Correspondence.

Editor Canadian Mining Journal:

Sir,—In your issue of May 15th last you give a summary of coal mining in Alberta for the year 1908, and, doubtless unintentionally, your correspondent has omitted even mentioning "The Edmonton Standard Coal Company, Limited," collieries at Edmonton. The same error occurred in the report in the "Mining and Metallurgical Industries of Canada" for 1907 and 1908, to which I called the attention of the Hon. W. Templeman, Minister of the Department of Mines at Ottawa, by letter dated March 31st, 1909, to the effect that on page 279 of the report of the "Coal Mining in Alberta" no reference whatever to the output of "The Edmonton Standard Coal Company, Limited," notwithstanding that the pay-roll for 1907 and 1908 amounted to over \$108,000, the largest pay-roll in the vicinity of Edmonton. The Hon. Minister made reply, regretting the omission, and enclosed a letter from Eugene Haanel, Director of Mines, dated Ottawa, April 2nd, 1909, regretting the mistake and assuring that it was unintentional, and enclosing a letter from Theo. Denis, who stated that the "name of the Edmonton Standard Coal Company, Limited, was omitted in the report on the mining and metallurgical industries of Canada through an oversight, and was attributable to a clerical error."

"Although I must own this is a serious one. The Edmonton Standard Coal Company, Limited, is one of the largest producers of the Edmonton district, and their predecessors, the City Coal Company, were among the first ones in that field to mine coal by means of a shaft, and for that reason alone deserve special mention."

Further: "That we are aware of the importance of the Stanard Coal Company is proved by the fact that it is included in our office list of 'Important Canadian Collieries,' and that a sample of several tons of their coal was collected last summer by an officer of the Mines Branch for the tests of Canadian coals now being carried on by us, and in the report of this work the Edomnton Standard Coal Company will figure with the other important coal mines of Canada."

There are two seams of coal on the company's property (which is the nearest colliery to Edmonton), a 5-foot and a 4-foot seam, which competent engineers

estimate to contain over five million tons. At the present time the company are operating the wider of the two seams, and are producing an average of 100 tons per day. The quality of the coal is superior to all other coal in the Edmonton district, and in a test of nine other mines competing for the city of Edmonton contract for power purposes the "Edmonton Standard" graded the highest, and was taken as a standard to grade the rest.

The contracts of the Provincial Government for public buildings, and the Edmonton School Board contracts and a portion of the city contract, have recently been awarded to the Edmonton Standard Coal Company, Limited, showing most conclusively, Mr. Editor, that it is one of the most important collieries at Edmonton.

I have no doubt you will give space in your valuable and well-edited Journal to correct the report regarding the coal mining in Alberta, and the injustice unintentionally done to "The Edmonton Standard Coal Company, Limited."

Yours truly,

H. MUNROE.

Sec.-Treas.

Editor Canadian Mining Journal:

Dear Sir,—In your issue of July 15th, you make mention of a new stope surveying instrument invented by Mr. Tonnesen, of the East Rand Proprietary Mines, Limited.

As a surveyor, I welcome anything which can lighten the burden of the unfortunate individual whose duty it is to measure stopes; but I must object to your statement that friction over such measurements was the main cause of the late strike on the Rand. It was dragged in, after the strike had begun, on various platforms as an additional grievance; but it never was a main issue.

The cause of the strike was the repatriation of the Chinese, whereby tens of thousands of labourers employed in stoping were withdrawn, and their places had necessarily to be taken by white men running rock drills, in the absence of native labour to replace the Chinese. To make the white man efficient enough to do this economically, it was necessary for him to run three or more rock drills, and this the miners refused to do; hence the strike.

It is worthy of note that this very same question of running three drills each caused strikes at two mines on each of which I was at the time surveyor, one on the Village Main Reef in 1902 and the other at the New Kleinfontein in 1905. In each case the miners were compelled to give in, and on going back to work found they could make far more money with three drills than with two, which up to that time had been the number supervised by each miner.

In laying the blame for the strike on the surveyors I think you are doing less than justice to a class of men who, while doing as a rule more work, and more disagreeable work, than anyone else engaged in the administration of mines, invariably come in for whatever kicks may be going around.

In all my experience as a mine surveyor I have invariably found that those men who "grouched" persistently at their measurement were the "never-sweats," the "born-tireds" and the wasters generally. I never met a really good rock drill men who grumbled, except in jest at the "— surveyor." I remain,

Yours truly,

J. D. RAMSAY.



### THE BIRTH OF AN IDEA.

Editor Canadian Mining Journal:

Sir,—In your issue of June 1st, under the heading of "Petroleum and Oils," you say: "Somehow we are led to believe that there may be a faint adumbration of truth in what Mr. Coste tells us." Pluck up your heart, Mr. Editor, and do not shrink back as if with pain from the thought that perhaps a new idea may enter in. If there are any theories of organic origin lodged in your brain, you are quite safe in casting them into the outer darkness where they belong. Take a trip down through the natural gas and oil fields of Ontario, and you will see that the organic theory is not worthy of even serious consideration. There are no carbonaceous strata from the surface down to the Archaean granite. There are no coal beds within hundreds of miles. Perhaps the gas was distilled from the coal of Ohio and migrated laterally like the Canada goose (*Branta Canadensis*) several hundred miles, in preference to escaping vertically through a thousand feet or so of rock. This theory may develop a difficult international question like the seal trouble in the Pacific Ocean. Our neighbours may claim that as the stuff had its birth or orig-

inated in their territory, it belongs to them. Down with the vegetarians or organists! Fiat lux.

Yours truly,

J. M. SLICKENSIDES.

The Editor:

Sir,—In your issue of July 15th, I note your item, "Buildings of the Badger Mine were totally destroyed by fire." I know that the item was published inadvertently, but it is misleading and unfortunate. We did lose our water tank and some of the old original log camp buildings. The new plant, which was erected this winter, was covered with galvanized iron, and, while we had a close call and are a little inconvenienced as a result of the fire, the actual loss is inconsequential, and we were able to resume our work as usual next day after the fire.

Yours truly,

BADGER MINES CO., LIMITED.

Per C. H. Bunker, Pres.

## INDUSTRIAL NOTES.

### WESTINGHOUSE ELECTRIC MINE INSTALLATIONS.

Among some recent notable installations of electrical machinery by the Westinghouse Electric & Manufacturing Company in the mining territory of several Western States there may be noted the following:—

The new blower-house of the Washoe Smelter of the Anaconda Copper Mining Company, at Anaconda, Mont., contains four 600 horsepower motors driving Root blowers, and two additional 600 horsepower slow-speed motors driving high-pressure air compressors for pneumatic-locomotive service.

The turbine plant of the Helena Power Transmission Company, Butte, Mont., is a Westinghouse installation. This supplies the local Butte mines in parallel with a 70,000-volt, 85-mile transmission line, and has performed some remarkable overload and emergency service.

The pumping station at the Leonard mine of the Boston & Mantana C. C. & S. M. Company, 1,200 feet underground, contains two 300 horsepower couples of two 150 horsepower motors, each direct-connected to Nordberg pumps and supplemented by a similar 150 horsepower motor driving an Aldrich pump. The station, 1,200 feet underground, is about 20 feet high, is lighted by arc lamps, and has a complete switchboard installation.

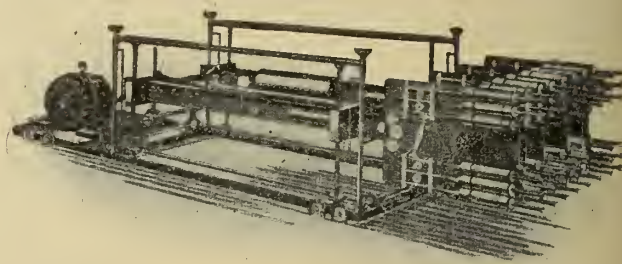
The semi-automatic relay-controlled hoist of the Modoc mine of the Anaconda Copper Mining Co., Butte, Mont., is also an interesting recent installation of the Westinghouse Company.

### THE BENNETT TUNNEL MACHINE.

This new tunnel machine, as will be seen from the accompanying cut, operates simultaneously a set of 48 air drills. It is claimed that the jar and recoil of the ordinary air-drill are completely done away with. Work is continuous. No explosives are used. The face

of a tunnel is drilled, broken, and cleared in one continuous operation. Space does not permit of a complete description of this ingenious contrivance. Further details will appear later.

Although apparently complicated, the machine is exceedingly simple in principle and operation. It is adjustable and flexible. Any number of drills can be



used up to the maximum. The power requirements for a 48-drill machine is 75 horsepower. One machine is being tried out successfully in Denver, Col.

Capt. A. H. Swarthout is the Canadian representative of the Ontario Bennett Tunnel Machine Co., Ltd. His headquarters are in Toronto.

The Westinghouse Electric & Manufacturing Company Pittsburg, Pa., has issued a handsomely printed little booklet describing the applications of its line of numerous illustrations scattered through the pages suggest many time and labor saving uses for these efficient little power devices; among these are the motor-driven adding machine, mailing machine, eraser, graphophone, envelope sealer, vacuum cleaner, buffing and polishing wheel, blower, sign-flasher, box-covering machine, hand drill, hack saw, coffee grinder, etc., applications selected at random from the large number



of uses where the electric motor provides the ideal power. The booklet, "Westinghouse Electric Motors for the Office, Store and Shop," will be sent on request.

W. F. Stanley & Co., Ltd., Great Turnstile, Holborn, London, W.C., are the manufacturers of Barnard's Co-ordinate spiral slide rule. They have just issued a book of instructions that is a complete guide to the use of this very necessary instrument. The user is able to perform with speed and accuracy, multiplication, division, proportion, continuous fractions, powers, roots, and logarithms. Moreover, the natural and logarithmic

values of trigonometrical functions of any angle can be determined with precision.

The Sullivan Machinery Company has installed a branch office at Australasia Chambers, Martin Place, Sydney, New South Wales, to further the sale of its air compressors, rock and diamond drills, coal cutters, etc., in the Australasian commonwealths. Its establishment is due to the growing importance of the mining industry in that field. The new office is in charge of Mr. Geo. R. Mair.

## SPECIAL CORRESPONDENCE

### NOVA SCOTIA.

**Glance Bay, July 20.—The Glance Bay Strike.**—It is scarcely a correct use of words to refer to the present labour troubles at Glance Bay as a "strike." The cessation of work by the adherents of the United Mine Workers, and the intimidation of hundreds of other men who wish to work, has not arisen out of the struggle of legitimate trade unionism against oppressive capitalism. It is not one incident out of the many that daily occur in the never-ending struggle of the proletariat against plutocracy that is as old as time and will still be waging when our civilization and our race is but a memory. Many of the deluded men who have gone on strike believe otherwise, and are honest in their belief, not realizing that they are the miserable victims of men whose mouths are filled with lies.

The Glance Bay trouble is but one of those struggles that will arise from time to time throughout this Dominion as each centre of industry and population has to decide whether Canada shall assimilate the stranger within her gates and make of him a law-abiding citizen of the Empire, or whether the stranger shall oust the sons of this young nation, and impose his customs upon us. It is strange that such a struggle should be centered in a portion of the Dominion where the people are known for their insularity and the tenacity of their opinions.

Probably there never was a strike in Canada that had less justification. The Dominion Coal Company are now dealing with the first strike in their history, and, in fact, there has only been one strike of any consequence in the coal mines of Cape Breton since 1868. The Canadian press, with the exception of one ephemeral and intermittent broadsheet that has made its appearance on perhaps a dozen occasions, has with one voice condemned the action of the United Mine Workers. Some provincial newspapers that have assiduously fanned the agitation for months past are now trying to lay the fire they have caused, much to the bewilderment of those simple people who believe what they read in the newspapers. All shades of public opinion, religious, political, and commercial, unite in deploring this strike as a national calamity. Nevertheless, a very large amount of misapprehension exists as to the true magnitude of the trouble. The vastness of the Dominion Coal Company's enterprise has so impressed itself on the public that it is assumed that any labour trouble that seriously affects its operations must have behind it the support of a large and determined body of men. This, however, is not the case. The United Mine Workers are in a decided minority of the Coal Company's employees, and their determination is a mixture of desperation and American money. At the end of the second week of the strike two-thirds of the Coal Company's employees are working, and many of them have risked and are risking their lives, voluntarily, to protect what they conceive to be their company's interests and their own. Before the strike the U. M. W. A. publicly announced in the newspapers that they were about to call out 95 per cent. of the Coal

Company's employees. On the first day of the strike the output of the company's mines was just about half a normal output, and the number of men that absented themselves was well under two thousand. Taking into consideration the number of men who were waiting to see how things would develop, it is safe to assume that the actual number of strikers did not exceed 1,700, which is generally supposed to be approximately the number of U. M. W. A. men in the Coal Company's employ. The day following was marked by disgraceful and riotous scenes. Men were beaten, stripped naked, assailed by the most opprobrious epithets imaginable, and things were said and done that deserve the most emphatic and sternest condemnation. As a result men were intimidated from coming to work, and we in Glance Bay witnessed the terrorizing of a community of ten or twelve thousand people by a body of persons who did not represent ten per cent. of the population.

The situation was not improved by the Mayor of Glance Bay, who applied a very extraordinary remedy for the amelioration of such intolerable conditions. This gentleman accepted the offer of the U. M. W. A. leaders to furnish him with a number of special constables to be sworn in to keep the peace, and a considerable number of the strikers were sworn in as special constables, in which position they played the dual role of pickets and policemen, a condition of affairs that has surely never been paralleled in any British municipality. The result of this peculiar civic action was such as might have been expected. These U. M. W. A. constables proceeded to arrest the special constables of the Coal Company, and the singular scene was several times witnessed of the Coal Company's officials being arrested and haled before a magistrate by some half-grown hobbledohoy clothed with a brief authority by the Chief Magistrate of the municipality. It was well that the populace saw the undoubted humour of the situation, otherwise it would have been intolerable. These appointments were after several days revoked by the Police Committee, upon which the Deputy Mayor and another councillor took upon themselves to re-make the appointments, which were speedily cancelled once more by the Police Committee. By this time no one knew how things stood, and the townspeople ceased to take any serious interest in the farce.

On the 7th of July it was seen that the civic authorities were utterly incapable of dealing with or appreciating the gravity of the situation, and following the refusal of the Mayor to ask for the protection of the active militia, the County Court Judge on the advice of the High Sheriff and the Warden of the county requisitioned the Department of Militia for the aid of the military, and they were sent from Halifax immediately. The presence of 500 soldiers has without doubt averted bloodshed and much destruction of property, and immediately after their arrival men commenced to report for work in increasing numbers. The outputs have crept up day by day, until they have



exceeded that obtained on the first day of the strike before the U. M. W. A. had introduced the little pleasantries which have rendered it necessary to have military protection.

The United Mine Workers have evidently a keen desire to control the mines of the Dominion Coal Company. At the Glace Bay Hotel, which during the past fortnight has provided rest and refreshments for the leaders of the opposing forces, and a horde of newspaper reporters, the U. M. W. A. have five of their officers from the United States, assisted by a clerical force of two female clerks and a male clerk. The business of these gentlemen in Cape Breton is to lead and supervise the campaign of an American labour union in its attack on one of the most important industries of Canada, in the attempt of a foreign union to usurp and destroy a Canadian union, which was in existence and was doing a good work many years before the U. M. W. A. had emerged from the womb of time. A gentleman prominent in American governmental circles, who has made a special study of industrial conditions on this continent, recently stated that the U. M. W. A. were very anxious to control the eastern mines of Canada in order to be able to neutralize them whenever a strike was considered necessary in the bituminous coal fields of the United States. This, and this only, is the reason for the presence of these U. M. W. A. gentlemen in Glace Bay. Their efforts will fail; must fail, in fact, because American domination in any shape is something that Canada will not tolerate. Annexation was once a live issue in the Dominion. It is now dead as Moses. Labour legislation and labour organization always lags a decade or two behind the general progress of our race, but when the time comes—and it is not far distant—when Canada chooses between international trade unionism, or, in other words, domination of Canadian unionism by that of the United States, and national trade unionism—when that time comes, the national spirit will assert itself. All attempts to dam back the rising tide of nationalism in the Dominion are futile, nay puerile, and remind one of Mrs. Partington and her broom. But these gentlemen do not care. They draw good fat pay for their efforts. The scale of U. M. W. A. relief in Cape Breton is \$2 per week per man, with \$1 for his wife and 50 cents for each child. This would just about liquidate the cost of one day's bed and board at the Glace Bay Hotel. When the strike has dragged out to its foregone conclusion these gentlemen will hie back to their own land, with undiminished paunches—and we may add, undiminished gall,—and will leave the poor victims of their campaign of falsehood to tighten their waist-belts and mourn their impaired finances.

The favourite expression used towards those men who are at work by the strikers is that of "scab." It is an expression that is more insulting than pointed. We venture the opinion that the scabbiest kind of scab is the man who is a turn-coat and a renegade to his written obligations. One of the signatories to the existing two years' agreement between the Coal Company and its workmen is Daniel MacDougall the Local President of the U. M. W. A. in Cape Breton. People who go back on their written obligations are usually known in this country as "quitters." The two years' agreement referred to stipulated that the rates and conditions agreed to remain in force for two years, or until 31st December, 1909. Recognition of the United Mine Workers would mean a change in conditions. Mr. MacDougall, who has had a considerable experience as a quick-change artist, may be able to explain how the Coal Company could recognise the U.M.W.A. and at the same time keep good faith with the P.W.A. and its workmen generally. We cannot, and we never yet met anyone who could.

One interesting result of the past two weeks' events has been to prove how thoroughly unreliable the statements of the U.M.W.A. leaders are, and have been. For a long time past the local newspapers have given a wide license to the U.M.W.A. and have published their claims in good faith. During the two weeks that have just gone, however, even the most indulgent newspaper men have had to confess that they were unable to place

any reliance on the statements given to them by the U.M.W.A. For example, Mr. Harry Bousfield, a gentleman whose accomplishments in the gentle art of stuffing newspaper men are not excelled by any of his colleagues, stated that the Coal Company could not possibly have produced more than 1,600 tons of coal on a certain day, unless they had transported it by aviation. As a matter of fact the Coal Company's output on that day was over 6,000 tons. No. 1 Colliery has so far been operated on a quite normal basis since the strike. The workmen there are P.W.A. men almost entirely, and the strike does not exist at No. 1 Colliery. Nevertheless the U.M.W.A. declared to all and sundry that the number of workmen employed there was not over 145 men. However that may be the mine that produced over 1800 tons of coal as a daily output, which would mean that so small a force as mentioned by the U.M.W. would have to "hustle some." To be exact, No. 1 had over 600 men. After a little more of this it was felt that in whatever else the U.M.W. was lacking, its capacity for prevarication was unstinted.

The result of the strike has never been in doubt. At the time of writing men are returning to work in greater numbers every day, and new men are coming in from the outside. One interesting feature has been that many of the younger men whose homes are in the country districts of Cape Breton, and who went home when the strike was called, speedily came back. In many instances the "old man" failed to understand why his son should have quit a lucrative employment at the beck of American agitators, and in more than one instance these young men have come back to work with a flea in the ear. Exactly two weeks after the commencement of the strike the Coal Company put on cars the not inconsiderable tonnage of 9,000 tons, to which total Dominion No. 1 contributed over 2,000 tons and Reserve over 1,100 tons. As we have previously had occasion to remark, the older mines, where the population is even yet largely composed of native born Canadians, have shown very little falling off in output, and the disaffection is chiefly confined to the newer mines such as No. 2 and No. 6, where the workmen are of all nationalities.

The pinch of need has not yet been felt, as the pay which was disbursed on the 17th was one of the largest in the Company's history. There are many poor wives and children, however, in homes across the water who will feel the pangs of hunger, for their husbands have been grossly ill-treated and deceived by the American leaders. These men have been prevented from working by the direct threats, the true significance of which their imperfect understanding of English does not enable them to perceive, and dread prevents them from giving the information which would enable the law to deal with these cowardly blackguards. These men have been told that if they work they will be remembered hereafter. They are told that things may be all right so long as the militia is here, "but you wait till afterwards." Many of them are going in mortal fear of their lives, and their plight is a pious one. Never at any rate in Nova Scotia has such shameful and wholesale intimidation been resorted to. The U.M.W.A. have imported interpreters from the mining districts of the States, who for months past have been instilling into the minds of these unlettered foreigners the awful consequences of thwarting the will of the U.M.W.A.

We ventured to forecast some two years ago that the coming of the U.M.W.A. into Nova Scotia meant "the bomb and the gatling, illegal trial and anarchy, and other choice flowers of American unionism." This forecast has been fulfilled to the letter, and, despite the attempts of certain interested parties to minimize the disorders which took place here, it was only the wise action of the authorities in sending us the militia, and the manner in which the troops have since been handled, that has saved us from scenes approaching civil war. The greatest honour is due to the loyal men of the Company, the railway men, the pier men, and in fact all the better element of the Company's personnel for the manner in which they have stood at



their posts. These men will see this thing through, and they deserve the thanks of the nation.

**Sydney.**—The backbone of the Glace Bay strike is broken. The Dominion Coal Co.'s shipments are steadily approaching the normal.

**Halifax.**—A large stamp mill, situated at Caribou, Halifax County, was burned to the ground early in July.

### QUEBEC.

In the case of the Eagle Mining Co. vs. Klipstein et al., judgment was given last week for the plaintiff. Cate, White & Wells, attorneys for plaintiff.

This was a case where defendants, having bought a mining property, making one payment down, defaulted on the deferred payments, and for no visible cause, having made no practical effort to mine (although that is immaterial). Plaintiff claimed that, so long as defendant was solvent, payments must be made as agreed, the defendant having no option to return the property; that the clause in such deeds which so many wrongly so interpret, is solely for the benefit of the vendor in case the buyer is insolvent, when the property reverts to vendor without action. Judgment with costs sustains this.

C. A. French and Dr. Mooney have engaged R. D. Morrison to superintend the erection of buildings for the Marsboro Gold Mining Co. The Mill property has been bought, and stamping machinery is being put in.

The St. Onge Syndicate has bought from N. S. Parker and D. T. P. Shaw an asbestos property near Mansonville, Que., for \$50,000.

Professors Dresser and Bell, of Montreal, inspected the Norton Copper Mine at Suffield, June 21.

A narrow vein of quartz carrying molybdenite was recently found in Southeastern Quebec, between granite walls; not of commercial value, but of interest as an ore rare in the province.

The Golconda Gold Mining Co. has its boarding-house nearly completed, and work on the property is proceeding favorably. It is probable that the order for machinery will be placed in Sherbrooke.

Mr. J. F. Mackenzie, of Montreal, accompanied by Mr. Wm. Marshall, of Toronto, spent a day on the property of the Compton Gold Dredging Co., in which Mr. Marshall has become interested. The financing of the enterprise is now proceeding favorably, and it is probable that a dredge will be installed this season. Mr. Mackenzie will go to New York next week in this connection. Mr. Marshall left Wednesday afternoon to look over some mining property in Nova Scotia.

### ONTARIO.

**Cobalt.**—A great deal of interest is being displayed in South Lorraine this summer, and throughout the whole of the district there is an air of activity that speaks well for the future of that section. On practically every property within a radius of two miles of Loon Lake work is being done, and as a consequence many discoveries, principally cobalt, have been made. Cobalt appears to be the principal mineral of the district, but in practically every case values in silver can be obtained on the surface. The general direction of the veins is northeast and southwest. The diabase is the best producing formation, but many important discoveries have also been made in the Keewatin, particularly when near a contact. Unlike the Cobalt camp, work up to date in the Huronian conglomerate has shown that formation to contain little of value. During the summer there will be a large increase in the amount of development being done, and if the same success is attained as has followed the work up to date, the district of South Lorraine promises to be one of the best outside of Cobalt. On the Great Northern claim only about 25 per cent. of the surface has been prospected,

and ten veins have been found. Two of these are aplite, with an average width of about three inches, while the rest are calcite, some of them carrying nickel and cobalt. Considerable diamond drilling is also being done. There is one shaft on the property, which is down a distance of fifty feet, and a 3-inch vein is showing in the bottom.

The south half of the Haileybury Silver H. R. 16 claim recently purchased by New York and Buffalo people is now known as the Magna Canadian. At the 70-foot level of the shaft a drift is being driven to the south on a 5-inch vein of calcite carrying small values in silver.

The new plant at the Keeley mine started running about the first of July, and it is working very satisfactorily. It is a suction gas producer of 220 horsepower capacity, and supplies power for the whole plant. The main shaft is now down to a depth of 130 feet, and at that point a station is being cut. On the west side of the property the new No. 3 shaft is down 50 feet on a large vein of cobalt. A force of 30 men is employed.

At the Wettlauffer, the new machinery is also running, and as a consequence development work is being done on a more extensive scale. The shaft is now down over 85 feet, and at the 60-foot level a station has been cut and a drift started on the vein discovered last fall on the surface. Another vein has been cut 30 feet to the south by a cross-cut from the station. In the bottom of the shaft the vein shows 6 inches of high-grade ore. At present there are 40 men employed on the property, but this force will be largely augmented in the near future. New camp buildings to accommodate 100 men are being erected.

The Harris-Lorrain syndicate, whose holdings consist of 20 claims, are getting ready to do a large amount of work. On the property G. F. 12 camps are being put in shape so that development work can be started on six claims in the northern section. On claim H. R. 88 a small 20 horsepower plant has been installed. In order to continue sinking, air will probably be obtained from one of the neighboring mines. The shaft is now down over 30 feet on a calcite and cobalt vein. This company are also developing their properties to the west of Ox Bow Lake, and on one of the claims there a shaft is being sunk.

The shaft on the Currie property is down 100 feet, and from the bottom a drift has been started on the vein. The vein was traced for some distance on the surface, where it had a width of from 2 to 5 inches.

At the Beaver Lake mine the shaft is down 90 feet, and drifts have been run north and south on the vein. There is 25 inches of vein matter, consisting of calcite and cobalt with some silver value.

Since the alteration in the mining laws of the Province of Quebec there has been a great increase in the interest manifested by prospectors, and it is quite apparent, from the number going in, that the country will be well explored. During the month of June fifty prospecting parties passed through Ville Marie. Mr. E. Boisseau, who has a property on Lot 5 of the south range of Favre Township, is putting in a small plant. A shaft will be sunk on a 5-inch vein of cobalt, said to contain good silver values.

The four diamond drills and one churn drill working on the big nickel deposit at mileage 222 of the T. & N. O. Railway, for the International Nickel Company, have been taken off. It is understood that the results attained were very satisfactory.

The diamond drilling has been stopped at the Alexandria Mine. Two calcite veins carrying good silver values were cut by the drill. The shaft will be sunk from the 125 to the 200 foot level, and from the lower level a cross-cut will be started to catch the new leads.

On the property of the Cobalt Leasers at Peterson Lake the diamond drill working there went through the diabase into underlying conglomerate.

The Hydraulic Company at Ragged Chutes have one of the intake shafts completed, and on the other one there is still 100



feet of work to be done. The outlet shaft is completed, and in the tunnel there is about 400 feet of work remaining before the two headings will connect. About five and one-half miles of the main pipe has been welded, and when it is finished four separate gangs will start the loop of 12-inch pipe which will encircle the district.

The big fire which wiped out the northern part of the town, has given the La Rose, Chambers-Ferland and Nipissing Companies, who own the land, the long-desired opportunity to prospect this territory. The Nipissing has had over 100 men at work trenching, and the work is almost completed. Proper surveys are being made of this section, and the ground will be laid out into building lots, with wider streets. Much-needed building restrictions will also be enforced.

The Nova Scotia has been having an unusual run of luck lately, several veins having been found within a week. The first important discovery, known as the Bilsky vein, was found near the manager's house, and it is one of the finest surface discoveries in the camp. While stripping this vein, two other cross-veins were located. At the junction of one, the more important of these, with the main vein, a shaft has been started. Subsequently two other discoveries were made, one distant about 75 feet and the other 190 feet from the Bilsky vein. All of these are high-grade ore. An interesting feature of the discovery of the Bilskey vein is the fact that it was crossed by a trench dug several years ago. At that time the prospectors had no knowledge of it.

The Nipissing Central Railroad Company, who are building the electric line between the towns of Cobalt, Haileybury and New Liskeard have had a large number of men working on the right of way, and a few days ago 100 more were started. The company expects to have the line completed to North Cobalt by the first of October. The section between Haileybury and New Liskeard will probably not be built this year. There is considerable difficulty experienced by the company in settling the matter of the right of way. The line has to run over the property of some of the mining companies, and so far no agreement has been reached by the different parties interested as to what the rental should be for using the land of the mining companies. It is altogether likely that the courts will have to be appealed to, to appoint an arbitrator, who will settle the question.

From one of the shafts on the Farah property a cross-cut is being driven at the 100-foot level to tap the "Blacksmith" vein, that in the open cut showed good silver values.

During the next week the Silver Cliff mine will ship a car each of high-grade and second-grade ore. The mine will now be put upon a regular shipping basis.

Recent development on the 195-foot level of the Cobalt Lake mine has proved the vein found to the west of No. 6 shaft to be a little better than three inches in width of high-grade ore.

At the meeting of the directors of the Nova Scotia held at the mine on July 15, it was decided to commence at once the erection of the new mill. Mr. Kirby, who designed the mill and worked out the process, will remain to take charge of the construction. The cost is estimated at \$100,000, and the building will be located close to No. 3 shaft house. The building itself will be 222 feet long and 84 feet wide. The building of this mill will be followed with keen interest by the operators of the camp, as it will be a very wide departure from the concentrators that have already been erected. The process will consist of crushing, amalgamation and cyaniding. A mill test of the ore has been made in Nevada. No concentrating tables will be used in the mill, although provision will be made for their installation if they are found necessary. The capacity of the mill is estimated at 90 tons per day. The product from the plates and the zinc boxes will be shipped from the mine in the form of bullion. Twenty 1,650-pound stamps will be installed.

The meetings held between the representatives of the Nipissing Central Railway and the mining companies regarding the right of way for the new electric road, have so far been

without results. The difficulty rises out of the rental asked by the companies, and it is altogether likely that the courts will be appealed to, to appoint an arbitrator.

The Maple Leaf Syndicate, Limited, is a new company recently organized in England for the purpose of taking over fourteen claims in the townships of Brewster and Corkhill. The head office of the new company is at Walbrook, London, E. C., and the promoters have raised the sum of \$50,000 to carry on the development work.

The contract for building the wagon road from Elk Lake to Gowganda has been let to the firm of Blair & McClelland, of New Liskeard. A good deal of difficulty was encountered by the department in placing this contract, as three contractors refused to do the work. As a consequence their deposits, amounting to \$2,600, were forfeited.

In the course of stoping on the main vein of the City of Cobalt, a shoot of high-grade ore about five inches in width was encountered. The Company proposes to carry on the exploration work on the surface by means of a diamond drill.

A rich surface find has been made in the north-west corner of the Hargraves property. The ore body is about six inches in width.

Work will very shortly be resumed on the property of the Townsite Mining Company. The capital necessary to carry on the work has been raised in England.

A new vein has been found on the 112 ft. level of the Kerr Lake Majestic at a point about 85 feet to the north of the shaft. The vein matter consists of cobalt with small silver values. It is understood that the Lewisoshns of New York have acquired control of the Kerr Lake Majestic, which adjoins the Kerr Lake, a property also controlled by them. They have also recently purchased the Michael claim, located on the east side of Cross Lake. So far but little work has been done on the latter property as it has been in litigation for about three years.

It is understood that La Rose has made arrangements to sell their big dump on the property adjoining the Right of Way.

While excavating for the new addition to the concentrator of the Coniagas a new vein was discovered. This company is running a trench up Prospect Avenue, one of the main streets of the town, in order to try to locate a vein reported to be in that section.

The petition, asking for an injunction to compel the directors of the Crown Reserve to stop the payment of dividends until the 231 shares now in dispute receive dividends along with the rest of the shares, has been dismissed. The statement for the six months ending June 30th shows a surplus of \$549,259. During that period there was a total of 1878 feet of development work done, and over \$40,000 was expended in new buildings and equipment.

The second asking for tenders for the mining lands of the Gilles Limit resulted in the sale of twelve lots aggregating 19 acres. As 283 acres were sold before, this leaves 392 acres still remaining in the hands of the Department. It is understood that another sale will take place later on.

#### BRITISH COLUMBIA.

**Rossland.**—As the directors of the Le Roi Mining Co. are in convention at London it is expected that word will be sent here to begin work at the Le Roi Mine any day now.

The Blue Bird Mining Co., through the managing director Mr. Lyman Carter, has acquired the lease which Whitford and Jenkins had on the mine. It is the intention of the Company to work the property itself, and a thorough plan of development will be worked out if some preliminary work that is being done turns out well. It is the intention to sink a double compartment shaft and open up the property at depth. At this writing, there is a quantity of ore at the mine awaiting shipment. Carbonate ore has been opened up on the Blue Bird that with a little sorting has returned about \$80 per ton. As there are several veins



on the surface of the Blue Bird, some of which appear to be offshoots of the main vein, it is expected that ore will be found in greater quantity as depth is attained.

Among the steady shippers to the Trail smelter, aside from the Centre Star group and Le Roi Two at Rossland, are the following mines: Snowshoe, St. Eugene, Silver Cup, Silver King, Granite, Yankee Girl, Richmond-Eureka, North Star, etc., etc.

The shaft on the Hattie Brown is now down over 75 feet, the vein showing up about six feet wide at this point. Recent assays give returns of \$49 per ton.

A meeting of the board of directors of the B. C. Mining & Development Co. was held during the past week. Dr. G. A. Ulerick was present from Chicago. The doctor is here for the purpose of discussing ways and means for the starting of work on the company's copper claims on St. Mary's river. A prominent engineer has made a report on the property and the outlook is favorable.

Le Roi 2, Ltd., continues to work along with the usual good results. During May, the confirmed report shows, 2168 tons of first class ore was sent to Trail smelter, from which the smelter receipts were \$48,349, or something over \$22 per ton, which is close to the yearly average. Eighty-two tons of concentrate returned \$41.44 per ton. According to average figures for this mine, the profits were approximately \$24,000; a good profit on the tonnage shipped, for this camp particularly. The yearly report of the Le Roi Two shows up very well as it has no big steam-air compressing plant to write depreciation off as one or two of the other local companies have. This concern produces air for drilling and clearing the mine from a neighboring plant and does its hoisting, etc., by electricity from the Bonnington Falls plant.

**Nelson.**—After nearly seven years of litigation the famous apex case of Star Mining & Milling Co. vs. Bryon N. White & Co. has come to an end in the Privy Council. The appeal of the White Company was refused, which leaves the decision as it left the Supreme Court of Canada, in favor of the plaintiff. The White Co. mined considerable ore from a vein which dipped into Star ground, but which to all appearances apexed on the claims owned by the first-named company. The vein, if it was one vein, was faulted at depth, being found again after some work through barren ground. The point of contention in the recent case was whether or not the ore in the ledge on the Star ground apexed on the property of the B. N. White Co., and from the decision of the Court it would appear the latter conclusion is arrived at from the evidence submitted.

An ore body of value was opened up at the St. Eugene last week. This property continues to look well underground. Shipments to the Trail smelter run from 550 to 700 tons per week; while the mill and concentrator is running steadily.

A new tunnel is to be started on the Aurora property across Ioyie Lake from the St. Eugene. There is a quantity of ore in the ground ready for shipment.

The Gold Note, a property near the Granite, shipped out four tons of high grade ore recently. It is planned to work the property all season.

Mining is particularly lively in the Salmo section this year. There are quite a number of prospectors in the hills, and active work is being done on many of the small mines. The Arlington is sending out a steady tonnage of \$65 ore, and there are 45 men working at the Second Relief where the mill is treating nearly 50 tons per week.

**Phoenix.**—A change has been made in the directorate of the C. Copper Co., which, it is anticipated, will mean even greater progress for this company in the future than has been the case in the past. Mr. Adolph Lewisohn, of New York, taking

advantage of the comparatively low price at which the stock of this company could be bought while the market was so quiet, has acquired a big interest in the concern, and has been made a director. The present outlook for the Copper Company is good. It has been possible to land copper in New York at 8c per lb. this year, and the company's mines at Deadwood, Wellington, Central, etc., have big quantities of ore in them ready for stopping, and will soon have much-needed railway facilities; that is, the latter two camps. Now that the Alberta coal strike has been settled, it is likely that the International Coal & Coke Company will soon commence to ship fuel to the Copper Company at Greenwood. It is a difficult matter to say, however, just when operations will be resumed, as the Greenwood Miners' Union has declared a strike against the B. C. Copper Company for alleged non-recognition of that body and discrimination against its members. No doubt the Copper Company would have resumed work as soon as there was sufficient fuel on hand, had it not been for this last affair. As it is, if some amicable arrangement is not made, there may be more or less difficulty in getting a full quota of first-class miners.

Another one of the promising mines in Franklin camp has been bonded. This time it is the McKinley group, which has been taken over by G. A. McLeod and associates, of Spokane, Wash. With the completion of the railway to Franklin camp the McKinley, Maple Leaf and other mines of that district will come rapidly to the shipping list.

A body of excellent copper ore has been opened up on the claims of the Columbia Copper Mining Co., Friday Creek. Some of the ore carries as high as 15 per cent. copper, with some gold. The ore has been pierced for 34 feet on one side of Friday Creek and a tunnel driven 71 feet on the opposite side.

The Greenwood-Phoenix tunnel has been driven 170 feet to date, the drilling being done by hand work. It is expected, however, that the compressor now in place at the mouth of the adit will be furnishing power in a few days.

A. B. Clabon, managing director of the Kingston Gold-Copper Mining Co., visited the property at Hedley last week. It is very likely that a compressor and power drills will be installed at the property in the near future, as development has reached a stage that would seem to warrant such action.

Among the names of newly registered companies in this province appears the title of the New Dominion Copper Co., capitalized at \$1,000,000 in shares of \$5 each. This is a smaller capitalization than was at first proposed by the reorganization committee, i.e., \$1,250,000. It is hoped that the mines of the New Dominion Company will be working by August 1st. A new Greenwood concern that is driving a parallel tunnel to the Phoenix-Greenwood tunnel into the high-grade hill at Greenwood is the Argo Mining & Tunnel Co., with a capitalization of \$125,000 in 25c shares.

The tunnel on the E. P. U. claim near Greenwood is now in the hill over 1,300 feet. It is expected by the operators, a Greenwood syndicate of mining men, that the ledge will be encountered any day now.

The plant at the Jewel mine, Long Lake, is to be augmented. It is thought that the new concentrating process the company has adopted will prove a success on Jewel ore. There are large quantities of concentrating ore in the mine.

**Vancouver.**—Placer gold has been found in the sands of Seymour Creek near here. Ground has been located on the creek by an old Australian prospector and others, and from 10c to 20c per pan is being obtained.

Samples running from \$26 to \$258 in gold have been taken from a ledge near Lillooet Lake that is nearly 300 feet wide. An Indian made the find. Several locations have been made, and further work will be done and average assays taken.



## GENERAL MINING NEWS.

## ONTARIO.

**Sulphide.**—Pyrite mining is becoming increasingly active. Two new concerns are now operating.

**Madoc.**—The Geo. H. Gillespie Talc Company is soon to double its grinding plant. Its product is now being shipped to Europe in addition to supplying the Canadian market.

**Cobalt.**—The Buffalo Mines, Limited, has placed at the disposal of the Cobalt civic authorities the tank and pumping apparatus installed at the Buffalo mine. This generous offer is much appreciated.

The Coniagas plant is soon to have 30 stamps added. This will make a total of 60 stamps.

**Sturgeon Lake.**—Numerous reports of gold finds are heard. Authentic news is lacking. The Provincial Government is to send Mr. E. S. Moore to the district before the summer is over.

## BRITISH COLUMBIA.

**Rossland.**—A considerable body of low grade ore has been found on the sixteenth level of the Centre Star mine, shipping

ore, 14 feet wide, has been encountered on the sixth level. The big ore shoot on the ninth level of the War Eagle has been opened up west from the crosscut.

**Trail.**—On Friday, July 9th, the smelter of the Consolidated smelted 250 tons of lead ore and produced 130 tons of bullion in 24 hours. This beats all previous Canadian records.

**Nelson, July 10.**—the amalgamation of the British Columbia Copper Company and the Dominion Copper Company, with the mines and the smelters at Greenwood, is definitely announced from the East.

The strike situation on the properties of the first named company remains unchanged.

The holidays interfered with the week's output, and the shipments appended in detail are below the average.

## YUKON

**Dawson.**—The first stamp mill erected in the vicinity of Dawson is soon to be in operation. It is a two-stamp mill, and is to be placed on the Lone Star property.

## MINING NEWS OF THE WORLD.

## GREAT BRITAIN

The eleventh hour agreement between the South Wales operators and miners, ratified by the Miners' Federation of Great Britain, was announced on July 1st.

After two hours' deliberation the following report was supplied to the press:—"The deputation appointed from the Federation to assist the South Wales workmen's representatives in their negotiations with the owners tendered a report of the joint meeting held at Cardiff yesterday, at which the following terms were adopted:—"The workmen's representatives having declared that it is not their intention to prevent the mutual introduction of any new method which may lead to the better working of the pits, due regard being had for safety and economical working, it was agreed that the owners shall have freedom to propose any method of working their collieries without being met with the objection that their doing so is a breach of custom of the Conciliation Board agreement, and the workmen allege that the proposed method of working is a source of extra danger to the workmen employed at the colliery. This question, in the event of a failure to agree at the colliery, shall be referred to the decision of an experienced and disinterested person to be agreed upon by the owners and workmen's representatives on the Conciliation Board, or failing such agreement, to an experienced and disinterested person to be appointed by the Home Secretary—the owners and workmen to be at liberty to call evidence before the person agreed upon or to be appointed. Any further objection to be brought before the Conciliation Board in the usual way, and the Board shall either decide the matter or report failure to decide within two months from the date of reference."

The conference decided, having heard the report of the deputation and the terms of the agreement, to adopt the same as satisfactory, and thanked the representatives for their services in the matter.

A discussion afterwards took place upon an application received by the miners in Scotland for a 12 1-2 per cent. reduction in their wages, a joint meeting to consider which is to be held in Glasgow on Wednesday next. After discussion the following resolution was unanimously adopted:—

"That this conference hears with deep regret that the Scotch coal owners are pressing for a reduction of 12 1-2 per cent, in the

workmen's wages in Scotland. And we hereby adhere to our previous decision to resist any such reduction. In the event of the employers pressing their claim we empower the officials hereby to call a special conference with a view to deciding whether rule 20 shall be put in force to resist any such reduction."

Rule 20, it may be explained, empowers the Federation to take a ballot of the whole of the miners in the United Kingdom as to whether the men shall hand in their notices and support the affected miners by causing a national stoppage.

## RUSSIA

The estimated gross production of crude oil by the Baker Russian Petroleum Company for the week ended June 26th, was 2,569 tons.

## SOUTH AFRICA

Mr. R.S. Holland, the British Board of Trade Commissioner, has completed his investigations of the Witwatersrand mining industry. Mr. Holland, in an interview, pointed out that German manufacturers had their representatives in the field, and that British manufacturers would have to follow suit. The opportunity of large business in mining machinery was exceedingly good.

The half-year's dividend distribution of Rand mining concerns amounts to £4,542,494. Including mines in outlying districts the total amount is £4,592,695. These dividend payments

represent 6s. 1½d. of every sovereign won. In the course of a speech at the Goerz annual meeting, recently held at Johannesburg, Mr Francke mentioned that the charge for blasting gelatine—the form of explosive most used by the mines—which in 1908 was 52s 6d per case, has been reduced to 45s per case practically all round; and as regards water legislation was contemplated with a view to enabling the Rand Water Board to cut down its rate of 3s per 1,000 gallons to a price in the neighbourhood of 1s. 3d. It is quite clear that such a reduction by the Rand Water Board will serve as a standard for the price of water for mining operations from other sources as well. Another matter affecting the unskilled labour question has been taken in hand—namely, the selections of a stope drill



light weight. Drilling in stopes has so far to a great extent been carried out by the manual labour of the natives, but if a suitable drill can be manufactured this work can be done by mechanical force and a large number of natives set free for other work. The trials now proceeding by the Chamber of Mines in conjunction with the Government are not yet concluded, but it can already be stated that the prospects of obtaining a practical and useful stope drill are favourable.

### UNITED STATES

An appeal is to be taken in the action of Bliss vs the Washoe Company (the smoke case.) An injunction to close the Anaconda smelter was refused the farmers of Deer Lodge valley. The appeal is against this refusal.

The Butte mining companies are experimenting with electric power as a substitute for steam in transportation. The change is expected to reduce costs by one-third of a cent per pound of copper.

### MEXICO

The announcement from the oil fields of Mexico of the large new company for developing the oilfields has attracted considerable interest. It concerns the future position and work of Messrs. Pearson and Son (Oilfields Department), and, if correct, exceeds in importance all news which has recently come to hand from this great centre or petroleum excitement and activity. The concessions cover the holdings of the Pearson Oilfield Department north and west of an imaginary line drawn at about 19 degrees long west from Washington, and extending from Vera Cruz (in an almost direct line south) to Puerto Angel, on the Pacific Ocean, in the State of Oaxaca. They include the Dos Bocas field, the scene of the famous burning oil fountain, and certain rights Messrs. Pearson & Son have acquired by contract from the Oilfields of Mexico Company. The Compania Mexicana de Petroleo El Aguila, Mexican in charter, operations

and character, will confine their interests to developing, exploiting and marketing home products in Mexico; they will not only produce and market the product of the fields north and west of the imaginary line drawn from Vera Cruz to Puerto Angel, but they will also market in Mexico the products of the fields south and east of the line and in the States of Vera Cruz and of Oaxaca, on the Isthmus of Tehuantepec, and the States of Tabasco, Chiapas, Campeche and Yucatan.

The old company of Messrs. Pearson & Son (Oil Fields Department) will produce, refine and export only, and will go out of the Mexican market, both wholesale and retail. Messrs. Pearson & Son are interested in the Compania Mexicana de Petroleo El Aguila as shareholders. For the present, however, the most productive fields owned by Messrs. Pearsons, lying south of the imaginary line, continue in the possession of that firm, leaving them with the refinery at Minatitlan and a large number of producing wells on the isthmus. Later accounts state that, while the capital of the new company is £5,000,000, not £3,000,000 as at first announced, it is a fact that all the shareholders are multimillionaires and control unlimited finance. One of the directors is Colonel Diaz, Jr., son of President Diaz. The company's lands are 3,000,000 acres in extent, and great refinery and pipe line extension schemes and new property acquisitions are being talked about.

Considerable conjecture is being indulged in with respect to the latest Mexican oil company and the concession recently granted to the Oil Fields of Mexico Company, and, although it is denied that any deal is pending between the two, business men anticipate that before long the Furber holdings will be acquired by the Compania Mexicana de Petroleo El Aguila. Nothing that is happening in petroleum centres on the other side of the Atlantic approaches in importance the conduct of Messrs. Pearsons in the oil fields of Mexico. Their investments are known to be considerable, certainly between £2,000,000 and £3,000,000, and they are still at war with Standard Oil interests.

## STATISTICS AND RETURNS.

### COBALT ORE SHIPMENTS—WEEK ENDING JULY 3.

|                                                      |          |
|------------------------------------------------------|----------|
| Nipissing Mine, Am. Smltg. & R. Co., Denver....      | 65,874   |
| Nipissing Mine, Am. Smltg. & R. Co., Denver ....     | 65,599   |
| Nipissing Mine, Can. Copper Co., Copper Cliff....    | 65,529   |
|                                                      | —197,002 |
| La Rose Mine, Can. Copper Co., Copper Cliff....      | 73,600   |
| La Rose Mine, Am. Smltg. & R. Co., Denver.....       | 65,000   |
|                                                      | —138,600 |
| Crown Reserve, Am. Smltg. & R. Co., Denver....       | 58,600   |
| Crown Reserve, Can. Copper Co., Copper Cliff....     | 60,265   |
|                                                      | 118,865  |
| Coniagas Mine, Coniagas R. Co., Thorold.....         | 82,000   |
| McKinley-Darragh, Am. Smltg. & R. Co., Perth Amboy.. | 57,700   |
| Kerr Lake, Kerr Lake Mining Co., Copper Cliff.....   | 62,085   |
| Peterson Lake, Am. Smltg. & R. Co., Perth Amboy....  | 40,570   |
| Buffalo Mine, Can. Copper Co., Copper Cliff .....    | 44,621   |
| O'Brien Mine, Deloro M. & R. Co., Deloro.....        | 63,998   |
| T. & H. B., Deloro M. & R. Co., Deloro .....         | 62,000   |
| Cobalt Lake, Am. Smltg. & R. Co., Denver.....        | 79,960   |
| Total .....                                          | 947,401  |

### COBALT ORE SHIPMENTS—WEEK ENDING JULY 17.

There was a falling off last week both in the number of mines that shipped ore and in the weight of the output. Compared with eleven shippers of the past three weeks there were only eight, and the tonnage amounted to 443,21, or 30.49 tons less than a week ago. The total number of pounds shipped during the week was 886,420. Nipissing again headed the list with 2,110 pounds, and Crown Reserve and La Rose came next with

shipments close up to the two hundred thousand mark. All the others failed to ship over 65,000 pounds.

|                             | Week ending<br>July 17.<br>Ore in lbs. | From<br>Jan. 1, 1909.<br>Ore in lbs. |
|-----------------------------|----------------------------------------|--------------------------------------|
| Buffalo .....               |                                        | 658,178                              |
| Cobalt Lake .....           |                                        | 79,960                               |
| Crown Reserve .....         | 188,320                                | 3,167,837                            |
| Coniagas .....              |                                        | 924,630                              |
| Cobalt Central .....        | 38,700                                 | 539,766                              |
| Chambers-Ferland .....      | 60,000                                 | 779,440                              |
| City of Cobalt .....        |                                        | 865,522                              |
| Diamond .....               |                                        | 920,000                              |
| Kerr Lake .....             |                                        | 1,173,216                            |
| King Edward .....           |                                        | 97,050                               |
| La Rose .....               | 151,000                                | 6,710,053                            |
| McKinley .....              | 64,420                                 | 1,057,806                            |
| Nipissing .....             | 259,110                                | 7,493,083                            |
| Nancy Helen .....           |                                        | 83,400                               |
| O'Brien .....               | 63,870                                 | 1,354,616                            |
| Peterson Lake .....         |                                        | 241,110                              |
| Right of Way .....          |                                        | 1,854,640                            |
| Silver Queen .....          |                                        | 255,275                              |
| Temiskaming .....           | 61,000                                 | 1,405,960                            |
| Trethewey .....             |                                        | 1,162,838                            |
| T. & H. B. ....             |                                        | 970,080                              |
| Muggleby Consolidated ..... |                                        | 72,900                               |

Total for week ..... 886,420

### ORE SHIPMENTS AND SMELTER RECEIPTS IN SOUTH-EASTERN BRITISH COLUMBIA.

Nelson, July 3.—Appended will be found the ore shipments and smelter receipts for the past week and year to date in tons:

| Ore Shipments.                     |        |         |
|------------------------------------|--------|---------|
| Boundary—                          | Week.  | Year.   |
| Granby . . . . .                   | 20,376 | 495,651 |
| Snowshoe . . . . .                 | 2,582  | 61,650  |
| Golden Eagle . . . . .             | 60     | 330     |
| Other mines . . . . .              | .....  | 140,624 |
| Total . . . . .                    | 23,018 | 689,255 |
| Rossland—                          |        |         |
| Centre Star . . . . .              | 4,541  | 84,854  |
| Le Roi No. 2 . . . . .             | 640    | 15,414  |
| Le Roi No. 2 (milled) . . . . .    | 260    | 6,600   |
| Other mines . . . . .              | .....  | 9,486   |
| Total . . . . .                    | 5,441  | 116,354 |
| Slocan-Kootenay—                   |        |         |
| Queen (milled) . . . . .           | 420    | 10,710  |
| Granite Poorman (milled) . . . . . | 250    | 6,350   |
| Whitewater Deep (milled) . . . . . | 700    | 18,000  |
| Kootenay Belle (milled) . . . . .  | 70     | 1,790   |
| Second Relief (milled) . . . . .   | 145    | 3,700   |
| Nugget (milled) . . . . .          | 110    | 2,810   |
| Bluebell (milled) . . . . .        | 900    | 23,000  |
| St. Eugene . . . . .               | 540    | 10,199  |
| Silver Cup . . . . .               | 179    | 724     |
| Silver King . . . . .              | 57     | 1,954   |
| Belcher . . . . .                  | 35     | 35      |
| Granite Poorman . . . . .          | 31     | 258     |
| Yankee Girl . . . . .              | 69     | 689     |
| North Star . . . . .               | 94     | 506     |
| Richmoud Eureka . . . . .          | 32     | 1,715   |
| Bluebell . . . . .                 | 250    | 2,585   |
| Other mines . . . . .              | .....  | 8,635   |
| Total . . . . .                    | 3,882  | 93,660  |

The total ore shipments for the week were 32,341 tons, and for the year to date 968,269 tons.

#### Smelter Receipts.

|                 | Week.  | Year.   |
|-----------------|--------|---------|
| Total . . . . . | 29,546 | 836,875 |

### B. C. ORE SHIPMENTS—WEEK ENDING JULY 10.

| Boundary—             | Week.  | Year.   |
|-----------------------|--------|---------|
| Total . . . . .       | 17,294 | 715,549 |
| Rossland—             |        |         |
| Total . . . . .       | 4,383  | 120,737 |
| Slocan-Kootenay—      |        |         |
| Total . . . . .       | 4,095  | 97,755  |
| Grand total . . . . . | 25,772 | 934,041 |

#### Smelter Receipts.

|                                   | Week.  | Year.   |
|-----------------------------------|--------|---------|
| Granby, Grand Forks . . . . .     | 15,307 | 511,288 |
| Trail . . . . .                   | 7,811  | 195,439 |
| Le Roi, Northport . . . . .       | .....  | 12,761  |
| B. C. Copper, Greenwood . . . . . | .....  | 140,505 |
| Total . . . . .                   | 23,118 | 859,993 |

Following are the figures of German consumption of foreign copper for the months January-May, 1909:—

|                             |             |
|-----------------------------|-------------|
| Imports of copper . . . . . | 65,956 tons |
| Exports of copper . . . . . | 2,648 "     |

Consumption of copper . . . . . 63,308 "  
as compared with consumption during the same period in 1908 of 68,893 tons.

Of the above quantity 60,353 tons were imported from the United States.—Reported by L. Vogelstein & Co., N. Y.

### TORONTO MARKETS.

#### Metals.

July 23.—(Quotations from Canada Metal Co., Toronto.)

Spelter, 5¼ to 5½ cents per lb.

Lead, 3.4 to 3.5 cents per lb.

Antimony, 8 to 9 cents per lb.

Tin, 30½ cents per lb.

#### Copper—

Casting, 13.5 per lb.

Electrolytic, 13.75 cents per lb.

Ingot Brass—10 to 14 cents per lb.

Pig Iron—July 23.—(Quotations from Drummond, McCall & Co.):

Summerlee, No. 1, \$23 (f.o.b. Toronto).

Summerlee, No. 2, \$21.75 (f.o.b. Toronto).

Midland, No. 1, \$19.50 (f.o.b., Toronto).

#### Coal—

Anthracite, \$5.50 to \$6.75.

Bituminous, \$3.50 to \$4.50 for 1¼ inch lump.

### MARKET REPORTS.

#### Coke.

July 30.—Connellsville coke, f.o.b. ovens—

Furnace coke, prompt, \$1.50—\$1.60 per ton.

Foundry coke, prompt, \$1.80—\$1.90 per ton.

#### Metals.

July 20.—Tin, straits, 29.125 cents.

Copper, prime lake, 13.375 cents.

Electrolytic copper, 12.80 to 12.90 cents.

Copper wire, 15 cents.

Lead, 4.30 to 4.35 cents.

Spelter, 5.425 cents.

Sheet zinc, 7.50 cents.

Antimony, Cookson's, 8.25 to 8.375 cents.

Aluminium, 21 to 24 cents.

Nickel, 40 to 47 cents.

Platinum, 22.50 to 23.50 per oz.

Bismuth, 1.75 per lb.

Quicksilver, \$43 to \$44 per 75 lb. flask.

### Silver Prices.

|                  | New York.<br>Pence. | London.<br>Cents. |
|------------------|---------------------|-------------------|
| July 7 . . . . . | 51½                 | 23½               |
| " 8 . . . . .    | 51½                 | 23 7-16           |
| " 9 . . . . .    | 51                  | 23½               |
| " 10 . . . . .   | 51½                 | 23 9-16           |
| " 12 . . . . .   | 51¼                 | 23½               |
| " 13 . . . . .   | 51                  | 23½               |
| " 14 . . . . .   | 50¾                 | 24 7-16           |
| " 15 . . . . .   | 51                  | 23½               |
| " 16 . . . . .   | 51                  | 23½               |
| " 17 . . . . .   | 50¾                 | 23½               |
| " 19 . . . . .   | 50¾                 | 23½               |
| " 20 . . . . .   | 51                  | 23½               |
| " 21 . . . . .   | 51                  | 23½               |

### MARKET NOTES.

**Silver.**—Favourable news is cabled from India as to rain but this is counterbalanced by the large stock of bar silver stock on hand at Bombay, 9,900 bars. Stocks are still accumulating at Shanghai, and these may be moved to India if prices rise.



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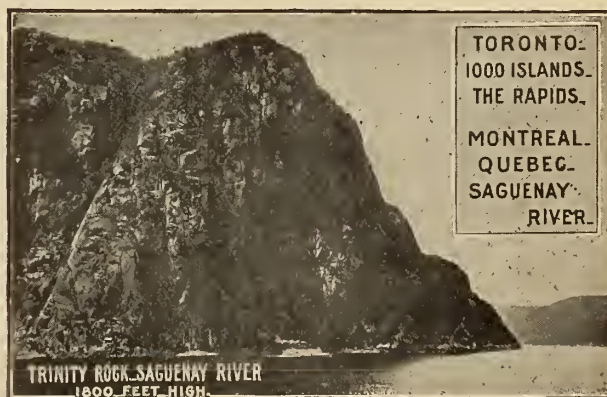
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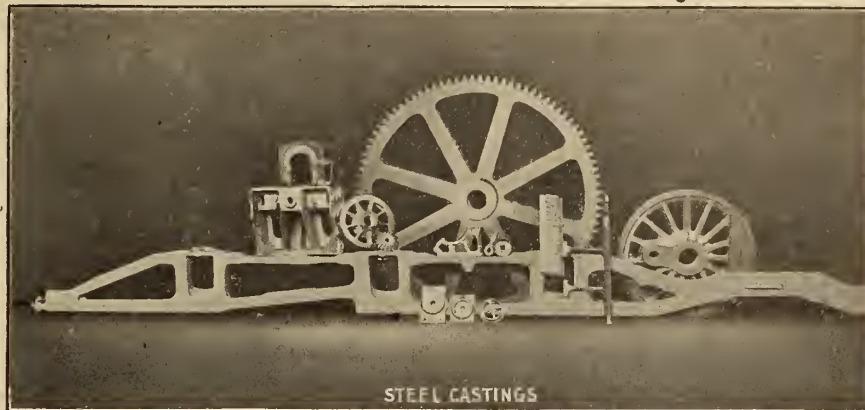
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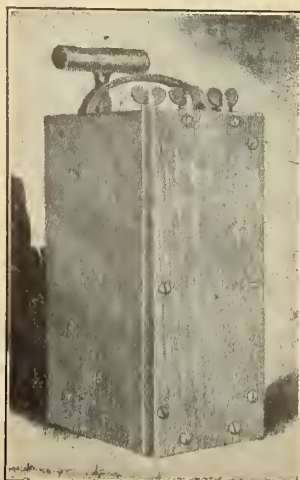
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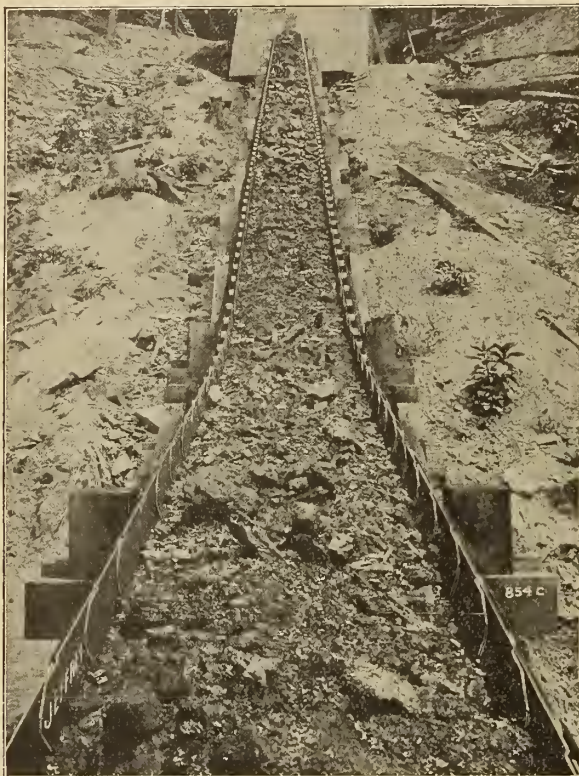
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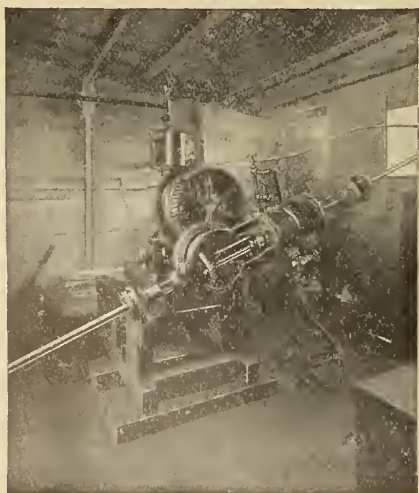
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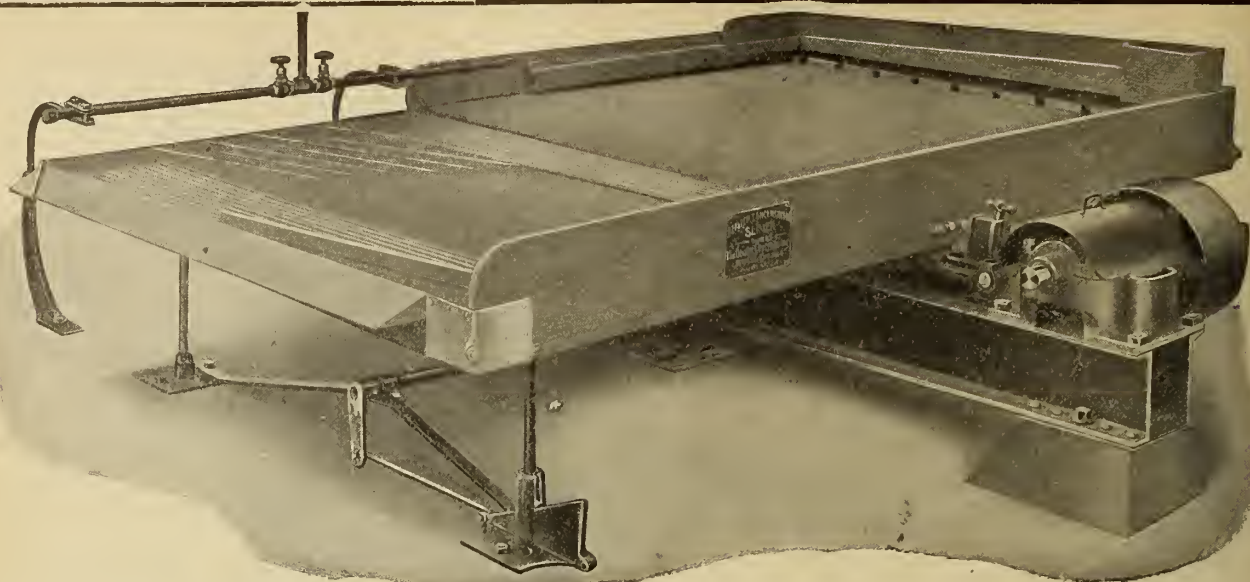
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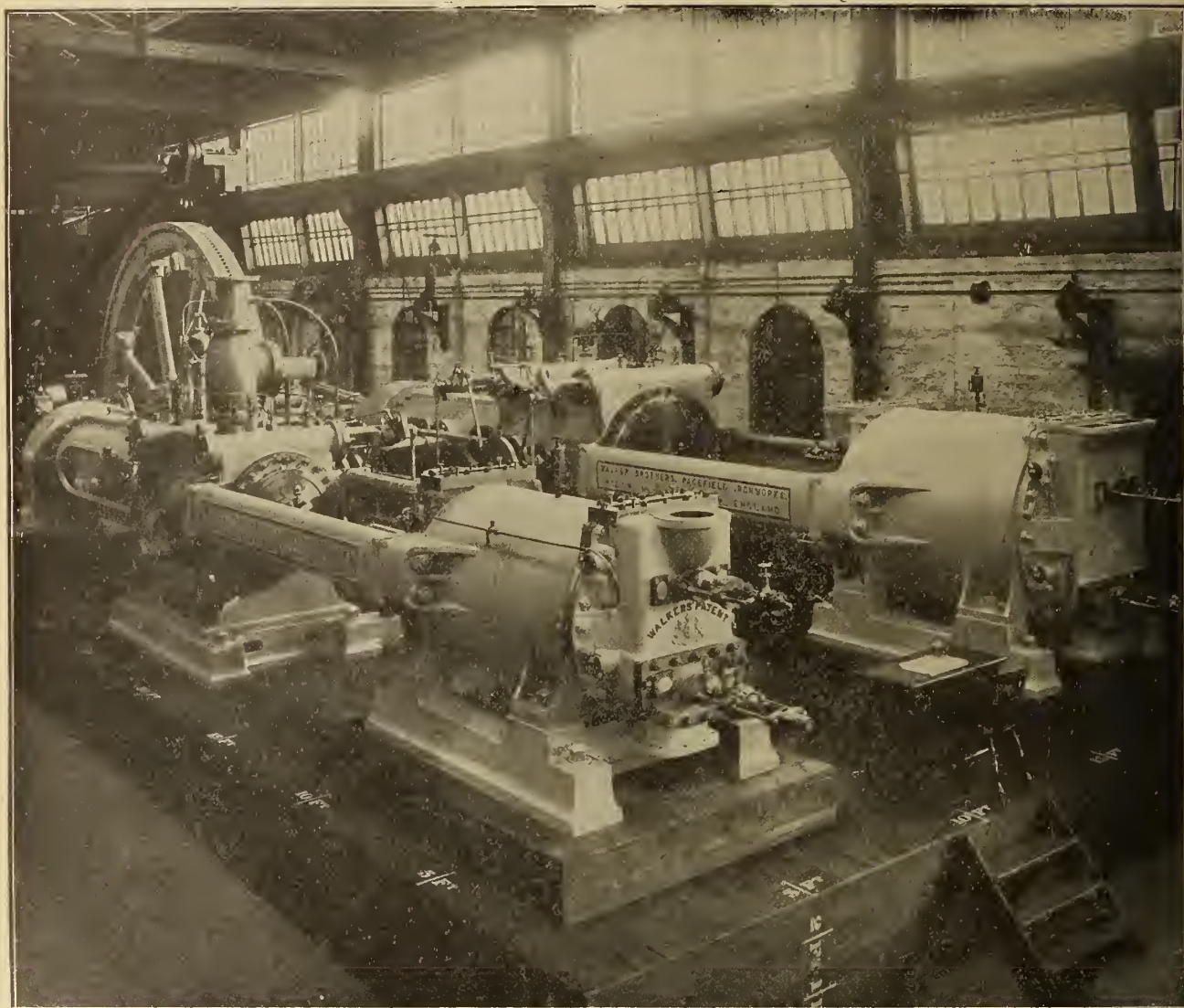
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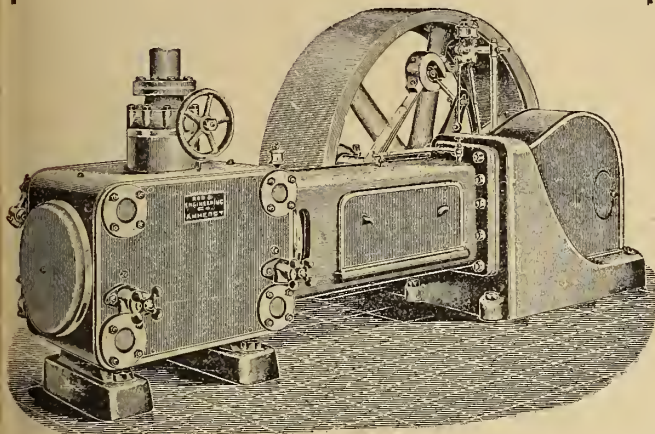
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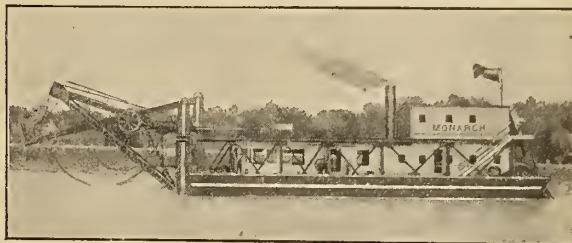
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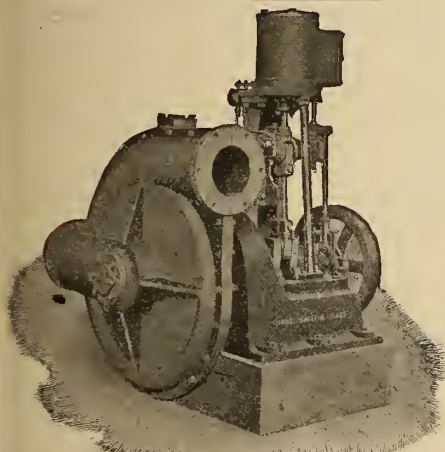
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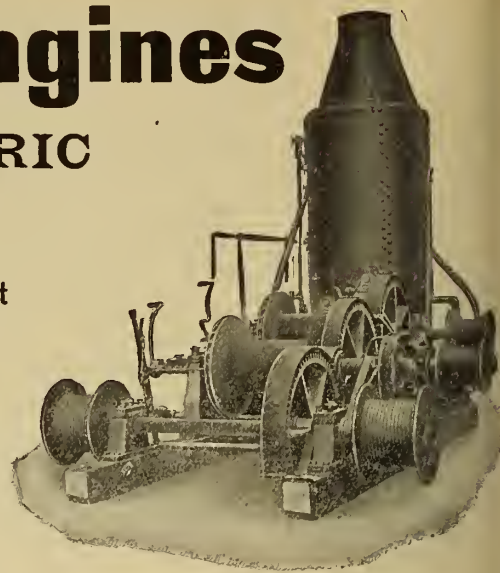
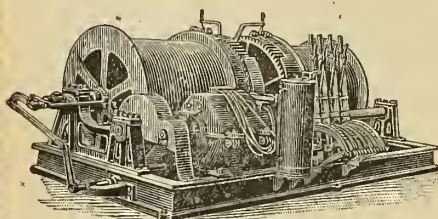
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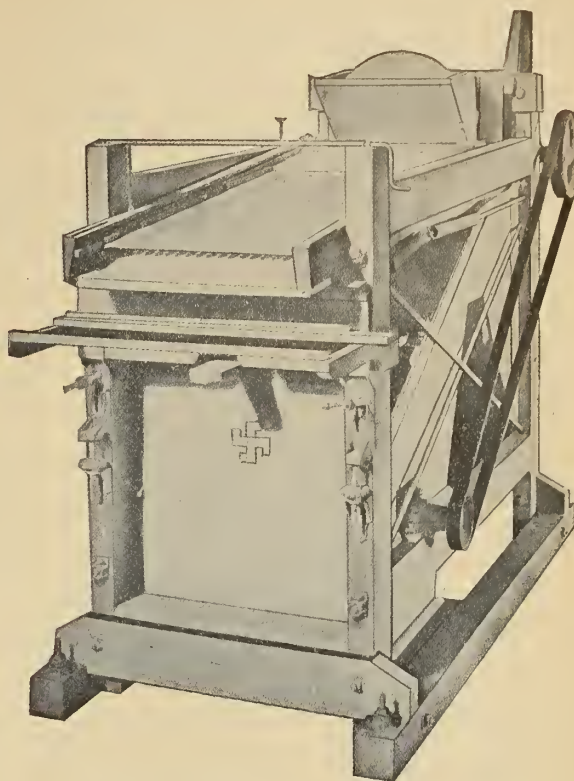
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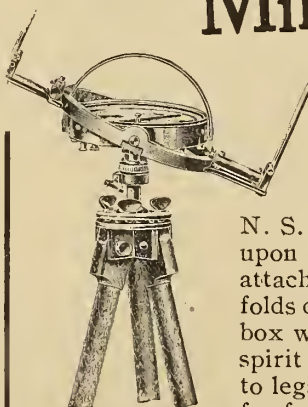
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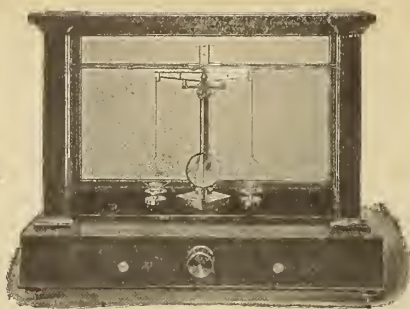
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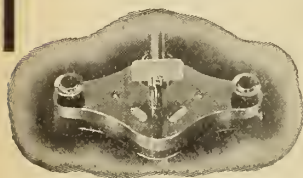
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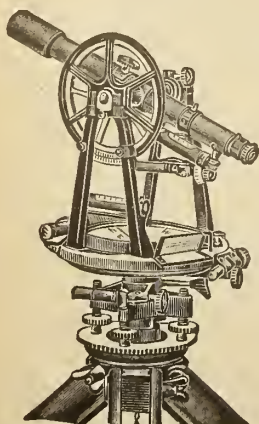
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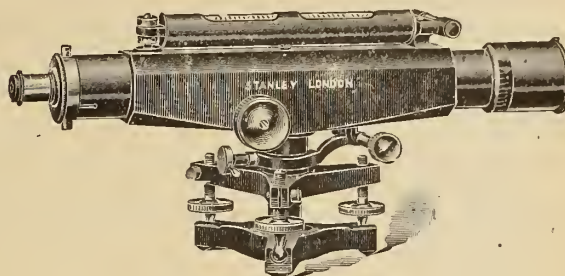
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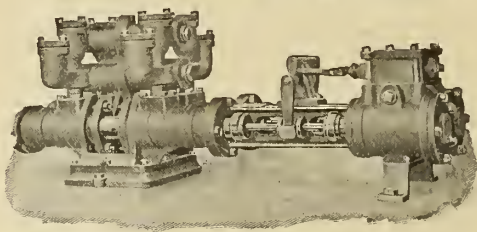
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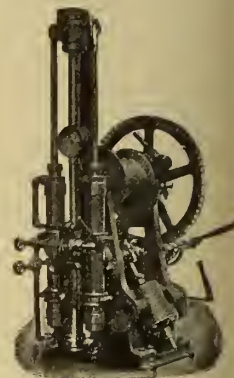
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, August 15, 1909

No. 16

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

**MINES PUBLISHING CO., LIMITED**

Head Office - Confederation Life Building, Toronto.  
Branch Offices Montreal, Halifax, Victoria, and London, Eng.

Editor:

J. C. MURRAY, B.A., B.Sc.

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### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of The Canadian Mining Journal were printed and distributed, at an average of 3,822 per issue.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

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## THE INFLUENCE OF THE RAILROADS OF THE UNITED STATES AND CANADA ON THE MINERAL INDUSTRY.

To that distinguished philosopher, Dr. James Douglas, the mining world acknowledges a large debt. He is one of that small class of thinkers who can infuse life and meaning into the dry bones of statistics. A sane advocate of the conservation of natural resources, his writings are inspiring and illuminating.

In his latest essay, a part of which appears on other pages of this issue, Dr. Douglas dwells instructively upon the inter-relation of railroads and the mineral industry. Many of the facts that he adduces will be new to our readers; his conclusions are momentous.

It is surprising to learn, or to be reminded, that the first transcontinental railroad, that across the Isthmus of Panama, was built to satisfy a mining craze. This line, connecting Navy Bay on the Caribbean Sea with Panama, 48 miles in all, constituted a short cut to California, and for a time the road depended almost entirely upon mining traffic.

The extent to which the development of mining in the Western States depended upon railroad building, and the present dependence of many of these railroads upon freight derived from mining, have hardly been recognized until recently. And Dr. Douglas has done more than any other writer to bring about this recognition.

We have referred before to the comparative proportion of freight attributable to mining in the United States and in Canada. These figures are given by Dr. Douglas as 53.09 per cent. of the United States in 1906, and 35.92 per cent. for Canada in 1908. The total mining freight hauled in Canada in 1907 was 56,497,885 tons, and in 1908, 63,019,000 tons. The corresponding figure for the United States (1906) was 435,450,476 tons. In the latter country coal and iron ore are the two most important commodities. Literally, traffic in these articles is the fundament of many thousands of miles of railroads. Conversely, these lines would never have been created but for the industries based upon the manufacture of iron and steel.

Similarly, the metalliferous mines of the United States support largely or in part many individual lines.

These facts are pregnant. Dr. Douglas, while referring to the notable work done by such Canadian lines as the C. P. R., the Canadian Northern, and the Quebec Central in developing the mineral resources of Canada, remarks that our railroads have had less influence in this direction than have those of the United States.

There are several causes underlying this condition. One is, obviously, the relatively sparse population of

the Dominion; another, the limited domestic markets. But, added to these is the indisputable fact that our railroad companies are not alive to the supreme present need of exploiting vigorously our mineral lands. Nor is public sentiment yet healthily aroused.

Not only is it imaginable, but it is highly probable that the Intercolonial Railroad will never become a profitable investment until something over fifty per cent. of the total freight moved on that line arises directly and indirectly from mining. This implies, first, the outlay of sufficient money to provide dockage and handling facilities at important shipping points, and, second, the construction of numerous subsidiary lines to mining centres.

The Grand Trunk Pacific must also embrace every opportunity to cater to the mining industry. The fruits of agriculture provide but sporadic freight. Neither manufactures, forests, nor any other class of freight can begin to supply the constant volume that is derived from mining and metallurgical enterprises.

Briefly, railroads and mining are most closely and more vitally interdependent. The growth of mining reflects itself directly upon the railroads. The extension of transportation facilities brings into being mining districts that otherwise could not exist.

The lowering and standardizing of freight rates, the establishment of loading and handling equipment at shipping ports, the concession of the lowest possible rates to mining pioneers, the construction of much-needed lines in old and new mining districts are themes that should occupy far more of the attention of our railroad magnates. They are themes, also, upon which we hope to have something specifically useful to say in the near future.

Meanwhile we urge upon our Canadian readers the desirability of taking to heart the lessons contained in Dr. Douglas' excellent paper.

### A NEW VANCOUVER COAL MINE.

The Pacific Coast Coal Mines, Ltd., is the name of the company that has recently opened up a coaling port at Boat Harbour, Vancouver Island. Boat Harbour is situated between Nanaimo and Ladysmith, some thirty miles from Vancouver. Here large ocean-going vessels can find ample accommodation. The bunkers are large, and the loading equipment has a capacity of 750 tons per hour.

The collieries are distant seven miles from the harbour. Railroad connection and modern rolling stock are already provided. The company owns 200 acres, and has rights over 5,000 acres in addition.

A large amount of tunnelling has been done already, and production has commenced. The seam at present worked is reported to be from five to twenty feet in thickness. Other underlying seams have been encountered in diamond drilling.

From accounts received it appears probable that the colliery of the Pacific Coast Coal Mines, Ltd., will rapidly become a serious factor in the industries of the Coast. Its equipment is modern, and its product is high-grade.

Competition is needed. We wish the new venture all success. If it can break the prices that citizens of Vancouver and Victoria have to pay for coal, it will have done well.

### THE SPRINGHILL DECISION AND TWO GLACI BAY INCIDENTS.

The report of the Board of Conciliation appointed to enquire into the complaints of the employees of the Cumberland Coal & Railway Company, Springhill, N.S., was made public on July 24. The chairman of the Board was Judge Longley. Mr. Charles Archibald represented the company, and Mr. E. B. Paul the miner.

As regards recognition of unions, the Board's finding is that it should be left to the employers' discretion to decide how far they will recognize organizations having central authority outside of Canada and controlled by interests that may at any moment engage in acute competition with Canadian producers.

The report, temperately and carefully phrased, indicates that the Board does not consider recognition of the U. M. W. A. either necessary or desirable.

As if to lend dramatic force to this report, two incidents occurred in Cape Breton. One was a brutal assault on an old man by the pickets of the U. M. W. A.; the other, an attempt to blow up the house of the manager of one of the Dominion Coal Company's collieries.

For the first incident the U. M. W. A. is directly responsible. As for the second incident it cannot be held guiltless.

We are confident that the U. M. W. A. will not flourish on Canadian soil. The organization proclaims its own unworthiness. Its ways are ways of violence and hate. It glorifies selfishness and is altogether unlovely.

### "THE MINING LAW OF CANADA."

Elsewhere will be found a review of this latest addition to Canadian mining literature. Here we wish to extend an editorial welcome to Mr. Morine's book.

We are grateful to him for saving us further vexation. He has provided a means of choking off importunate enquirers. Heretofore it has been practically impossible to satisfy seekers after light on Canadian law.

Seriously, Mr. Morine has accomplished a large task satisfactorily. His book will become a standard. Mining men need no reminder of the difficulties that the absence of any modern compendium of Canadian mining law has entailed.



### U. M. W. A. METHODS.

The United Mine Workers' Journal, the official organ of the U. M. W. A., is a weekly published in Indianapolis. Its editorial columns are filled with the kind of stuff that incites ignorant men to violence. From casual inspection of its editorials we are led to conclude that its methods are mediaeval.

For instance, in referring to the Glace Bay strike, the U. M. W. Journal of July 22 remarks editorially that the Dominion Coal Company pays a maximum wage of \$1.40 per day. This is so absolutely absurd that it warrants the conclusion that the U. M. W. A. is consciously hard up for an excuse, and that its organ is doing its best to manufacture a colourable story.

Unionism of this kind is not wanted in Canada. As

we suggested in our last issue, deportation of U. M. W. A. agitators is a necessity.

### A CORRECTION.

In our issue of August 1st, page 461, there appeared a statement to the effect that the Cobalt Hydraulic Power Company, Limited, had presumably stopped work at their plant at Ragged Chutes. The Journal has received a communication from the company, in which this report is categorically contradicted, and in which, also, it is stated that work is progressing most satisfactorily.

We are sincerely sorry to have done an inadvertent injustice to any enterprise.

## THE MINERAL EXHIBITS AT THE ALASKA-YUKON-PACIFIC EXPOSITION.

By E. Jacobs, Victoria, B.C.

The mineral department of the Alaska-Yukon-Pacific Exposition, at Seattle, Washington, U.S.A., is on the whole fairly representative of the mining industry of the Pacific Northwest, though it is in a measure disappointing, by reason of the meagreness of the exhibits of some camps that should have made an excellent showing. While this qualification applies to the display of minerals in the Mine Building, it is not applicable to either the Alaskan or the Canadian mineral exhibit, for both these are comprehensive and decidedly creditable to those who had charge of the collection and display of the mineral specimens and associated exhibits gathered together and advantageously arranged in the respective buildings of these countries.

Among the exhibits relating to the mining industry, but not directly connected with the Pacific Northwest, that of the United States Geological Survey naturally occupies a leading position. California and Utah each has in its building a mineral collection worthy of notice, in this respect being unlike Oregon and the several counties of the State of Washington, which have their own separate buildings, but have given little, if any, attention to this section of their natural resources. The only foreign countries other than Canada showing samples of minerals are the South American republics and Japan, and neither of these has a large mineral exhibit.

### Canada's General Exhibit.

As many readers of the Canadian Mining Journal will probably look for prominence being given in this description of the mineral exhibits at the Exposition to those of Canada, these will here have attention. Before dealing with them in particular, though, the general excellence of the whole display of the natural products of Canada will be briefly noticed.

**The Canadian Building.**—An idea of the external appearance of the Canada Building will be conveyed by the accompanying reproduction of a photograph of it. While not centrally situated, it is by no means in an out-of-the-way locality, for it is immediately behind the Music Pavilion, frequent concerts in which consti-

tute one of the more popular attractions of the Exposition. Further, it is in close proximity to two much-frequented walks, one from the south entrance to the grounds, and the other from the steamer landing on Lake Washington.

It will be observed that there are in the Canada Building two main entrance doors. Immediately inside these is the information bureau, while to the right are



CANADA BUILDING.

the women's rest-rooms and to the left the offices of Commissioner Hutchinson and his staff.

**Representative Exhibits.**—Upon entering the exhibit hall, the visitor is impressed by the evident fact that the whole display has been gathered together, placed, and adorned by men who are adepts at their work in this connection. Systematically arranged, attractively displayed, artistically ornamented, and



effectively placarded with terse and cogent statements relative to the staple products of the country, the whole exhibit is a valuable demonstration of the varied natural resources of Canada. In fact, the verdict of the careful observer may, without any exaggeration whatever, be put into words applied by the "Canadian Gazette" to the Canadian exhibit at the Franco-British Exhibition in London, as follows: "As a cleverly thought out advertisement, as an artistic piece of work, as a thoroughly able object lesson in what Canada can do, the exhibition in the handsome white building would be hard to surpass."

A number of alcoves or recesses, some enclosed in glass, occupy the sides of the hall, the central one on each side being much larger than the others. The full length of the far end is taken up by a striking panoramic view showing several stages of progress made by the settler on Western farm lands until he becomes established in a comfortable home; also live stock in grazing country, and rugged mountain scenes. This big picture forms a background for a large group of stuffed Canadian animals and birds, ranging in size from moose and grizzly bears down to small waterfowl. Down the centre of the building are five capacious glass show cases, each 18 feet in length, while arranged along the aisles are 52 glass-covered table cases, these last, as well as some of the larger ones, being filled with minerals.

The interior decorations are chiefly artistic designs in grain on a red ground, these forming a handsome frieze above the exhibits. Numerous transparencies and other coloured pictures show various scenes and phases of life in Canada. Behind the large central recess on one side of the hall is a picture of a river; in front of and across this a representation of a beaver dam has been built, and over the dam a stream of water continuously flows into tanks in which live Canadian beavers are kept as an exhibit of "the earliest known wood-cutters and dam-builders in the world." This very popular scene is flanked by many short logs of pulpwood—spruce, balsam and poplar, arranged in tiers—and by paper and other products manufactured from pulpwood. On the opposite side, the corresponding recess is filled with Canadian fruits, chiefly apples, of which there is a large and attractive display, both fresh and preserved, and having as a background an orchard scene, depicting men gathering apples and placing them in barrels for shipment to market.

A forestry and wood industry exhibit includes Canadian woods in considerable variety—some cut into planks or otherwise fashioned, and stained and polished to show decorative effects for which they are suitable. The fish exhibit consists of many cases of preserved specimens of Canadian fishes, large and small; while the commercial side of the fisheries industry is represented by pyramids of canned fish. Grasses, grains and cereal food products fill two large central cases and four side recesses.

While the sources of the exhibits are indicated by different colours on the labels, showing which provinces the respective exhibits are from, the idea of provincial exhibits is not intruded. On the contrary, the homogeneity and admirable proportion of the whole display is generally well maintained, so that the complete exhibit is essentially a Canadian one, and Commissioner Hutchinson and his staff do not lose sight of this, nor fail to impress visitors with the fact. Said the experienced Canadian Exhibition Commissioner to a newspaper representative: "Just look about this hall and

you will observe that Canada stands out so boldly that no one can be carried away with the idea that this is an exhibition of the products and manufactures of Ontario, Manitoba, British Columbia, or any of the Maritime Provinces. We talk Canada first, and let the rest fall in line." This commendable policy has, however, to some extent been modified as regards the fruit, cereals, and mineral products of Western Canada, for the Exposition being primarily to exploit Western resources, a proper concession has been made to its objects, and the prevailing spirit.

#### The Mineral Exhibits.

The mineral exhibits occupy a total of about 18,000 feet of space, of which more than half has been devoted to those from British Columbia. From its contiguity to the State of Washington, and its consequent nearness to the place where the Exposition is being held, this province, as might be expected, makes by far the largest display in minerals. To detail the numerous mining camps, not to mention individual mines, that have contributed mineral specimens to the Canadian exhibit, would require much more space than is here available. It may be mentioned, however, that not only are the older mining camps—Ainsworth, Slocan, Nelson, Rossland, and Lardeau, in West Kootenay; Fort Steele and other divisions in East Kootenay, and Vancouver Island—generally well represented, but several of those that are comparatively new have gone out of their way to bring to notice through the publicity afforded by the display of samples of minerals at this largely attended Exposition, some of the mineral resources of their respective districts. Among those that have in this way assisted are, Hedley and Princeton, in the big but practically undeveloped Similkameen District; Sheep Creek camp, in Nelson mining division (represented by a large lump of gold-bearing ore from the Nugget mine, information relative to which has lately been much before the public in British Columbia, and the new and promising gold-silver-lead mining camp in Portland Canal District, in the northern part of the province.

Speaking generally, the Canadian mineral exhibit is a very useful object lesson to thousands of residents of the United States who had not previously had opportunity to learn anything from personal observation, of Canada's large and important mineral resources. To many of these the assertion made in connection with the exhibit, that "Canada has a greater variety of economic minerals than any other country in the world," appears more likely to be true when supported by such a comprehensive and really excellent exhibit of minerals as that here made. And just at this time it may be permitted to turn aside for a moment to give credit to Exhibition Commissioner Hutchinson and his zealous lieutenant in the mineral section, W. D. Dalglish, for the comprehensive and representative display of Canadian minerals contained in the collection gathered during a series of years by Canada's Exhibition Branch. Much praise is also due to R. L. Broadbent, of the Geological Survey Branch of the Dominion Department of Mines, for his persistence and good judgment in collecting mineral specimens from the many camps and individual mines he has from time to time visited in the performance of this arduous work. Further, it is an important advantage to have two officials so well posted concerning the minerals of Canada in attendance at the Exposition to give reliable information relative to the exhibits in their particular section of Canada's creditable display of its chief products.



Before passing on to deal in more detail with the various minerals exhibited, it may be well to state that in a number of particulars the exhibit as a striking as well as a creditable one. At the Exposition the claim is advanced that Canada has the best and richest deposits of asbestos in the world, and here is made an imposing exhibit of that mineral, manufactured larger, probably, than nine-tenths of the visitors had ever before seen. Again, in support of the assertion that "Canada has the greatest nickel deposits in the world," there are nickel exhibits that must go a long way toward carrying conviction as to the truth of the statement. Similarly, the pronouncement that "Canada's cobalt-nickel arsenides and silver are now attracting the attention of the whole mining world" is received favourably when there is seen at hand a very large and attractive display of the ores thus referred to. And so on throughout the mineral section; important facts are prominently placarded, and nearby are examples of the mineral products of the Dominion in behalf of which they are stated. One more significant fact should be referred to here, namely, that "Canada's mineral production has increased over 500 per cent. in 15 years."

It may possibly be that in two or three other parts of the Exposition there are bigger collections of minerals; it is certain that in the Alaska Building the large and quite unusual display of placer gold is more fascinating to the general public; but for general excellence and practical serviceableness in attaining the main objects in view in taking part in such an Exposition, it may be claimed, without exaggeration or failing to do justice to other mineral exhibits at the A. Y. P. Exposition, that Canada's mineral exhibit, as a whole, stands first. It may be said of the Canadian mineral exhibit at Seattle, as was said by the London Times of that at the Franco-British Exhibition in London: "The mining industry is exceedingly well represented, and the exhibit is a facsimile of that shown by Canada in the great exhibition at St. Louis a few years ago. American geologists from Washington declared at that time that this display of economic minerals was the best that had ever been collected and exhibited by any country. This can readily be understood when it is taken into consideration that from ocean to ocean the Dominion extends 3,500 miles, and from north to south 1,000 miles."

Taking the various minerals separately, the exhibits are noticed in some detail in the following paragraphs:

**Placer Gold.**—One table case contains about 100 1-oz. samples of alluvial or placer gold, each from a separate creek. Three-fourths of these are from Yukon creeks, a few from the Province of Quebec, and the remainder from British Columbia. Together they constitute a representative collection of samples of Canadian placer gold. They are supplemented by models of most of the large placer gold nuggets known to have been found in the Dominion. That of the largest Quebec nugget, known as the "Kilgour," and which weighed 52 oz., is not included, but the one of the "McDonald" nugget, found in 1866 on Gilbert River. Lot 16 of the De Lery concession (weight 45 oz. 12 dwt., value \$851.26), is among those on exhibition. Other models are of several large nuggets from Cariboo and Cassiar, B.C., and still others from Yukon Territory.

**Lode Gold.**—There are many specimens of gold-bearing quartz from Nova Scotia, Ontario, and British Columbia. Of these Nova Scotia has some of the richest and most attractive, one table case, especially, being

full of beautiful specimens from that province. Samples of ore containing gold are most numerous from British Columbia, which province contributes nearly all of the annual lode gold production of the Dominion. Incidentally, it may be mentioned that by far the greater part of the lode gold produced occurs in combination with copper, and is recovered by smelting; that from stamp-milling usually ranges between 5 and 15 per cent. of the total. Of the gold-copper ores, those from Rossland mines merit notice. These include large lumps of ore from the Centre-Star group, Le Roi, and Le Roi No. 2, the last-mentioned probably carrying highest average gold values.

**Silver.**—Ores containing silver are exhibited in considerable quantity, but in most instances other metals are associated with it. Cobalt-nickel arsenides, from Temiskaming, niccolite, also with smaltite and native silver, from near Haileybury; native silver from Cobalt, and other Northern Ontario ores in which there is much silver, interest many visitors, while the silver-lead ores of British Columbia also make an excellent showing. Ores from both these provinces are prominent features of the Canadian mineral exhibit, and enquiries concerning them are many. As attractive specimens of silver ore, those from Cobalt and neighbouring districts must be placed first, though there are some British Columbia silver ores (notably a large specimen showing much native silver from the Elkhorn mine, Boundary District) that also engage attention. Big blocks of silver-lead ore from the Slocan District are among the latter. There is, too, a case of galena ores from Lake Temiskaming, Quebec.

**Lead.**—Outside, in front of the Canada Building, two unusually large samples of ore, together about four tons in weight, from the St. Eugene mine, in East Kootenay, B.C., are generally noticed. The St. Eugene, owned by the Consolidated Mining & Smelting Company of Canada, Ltd., is the largest and most productive lead mine in the Dominion. During the last five years more than \$800,000 tons of its ore have been milled, from which about 125,000 tons of concentrates, averaging approximately 66 per cent. lead, have been made. Last year's tonnage was the biggest since the mine was opened, while the current year's output will probably be still larger. There is, however, a peculiar fitness in the biggest lead mine in Canada being represented by the largest sample of ore from one mine in the whole of the Dominion mineral exhibit. Other British Columbia mines producing lead also have large samples of ore on exhibition, these being chiefly from Slocan District mines.

**Copper.**—British Columbia also leads in copper ores, whether those of low-grade from the Boundary District, or having associated with the copper appreciably large values in gold and silver, as in the case of ores from Rossland mines, and others from the Coast district. More than half a ton of bornite ore, from the Marble Bay mine, Texada Island, B.C., makes an exhibit of more than ordinary interest, from the fact that this ore was mined at a depth of between 900 and 1,000 feet. There is at that depth a fine body of it, and geologists and mineralogists are finding it necessary to revise their theories as to the non-occurrence at depth of bornite ore. In the Marble Bay mine the silver associated with the copper has increased in quantity as greater depth has been attained. Other bornite ores are from the Cornet mine, also on Texada Island, and from Whitehorse copper camp, in Southern Yukon. A good exhibit of copper gold ore comes from M. K.



Rodgers' Hidden Creek mine, on Observatory Inlet, Northern British Columbia, which mine is now being developed. In the exhibit of the Canadian Copper Co., of Sudbury, Ontario, there are a number of samples of chalcopyrite ores, and a heap of roasted copper-nickel matte. The Colonial Copper Co. has an exhibit of native copper from Cape D'Or, N.S. Chalcopyrite ores from Ontario and Quebec are also shown.

**Iron.**—The mining of iron ore not yet being an established industry in Western Canada, the exhibits of this mineral are neither numerous nor large. British Columbia iron ore deposits are practically unrepresented. Most of the samples of ore and manufactured iron are from Ontario and Nova Scotia, with a few from Quebec and British Columbia. There is some pyrrhotite, both crude and roasted, from Sudbury, Ontario. Eight pigs of iron are shown with some bog-iron ore from Drummondville, Quebec. The Mines Branch of the Dominion Department of Mines, Ottawa, has on exhibition pig iron produced by the electric-thermic process. There are also some magnetic iron sand and chromite concentrates from Quebec. Sections of heavy steel rails, from Sault Ste. Marie, Ontario, are exhibited by the Algoma Steel Co.

**Zinc.**—Not much zinc ore is shown. Among the comparatively few samples are some from mines in the Slocan District of British Columbia, where zinc blende occurs freely in association with galena. Zinc concentrates, also bars of spelter made in the West, are among the zinc exhibits, and, too, some blende from Quebec.

**Nickel.**—The joint exhibit of the Canadian Copper Co., Sudbury, Ontario, and the International Nickel Co., New York, includes copper-nickel ores and heap roasted matte, standard and bessemerized nickel-copper matte, and other nickel products. Besides nickel shot and plaquettes, there are shown many articles made of pure nickel—wire in coils and spools, strips in coils bound with nickel straps and rivets, rods, tubes, trays, coins of the world, chafing dish, etc. The Mond Nickel Co. is also an exhibitor of nickel products. Niccolite, chiefly from Northern Ontario, is among the ore exhibits.

**Other Metallic Ores.**—Among these are cobalt, from Northern Ontario; cinnabar, from Kamloops mining division, British Columbia; molybdenite, from Ontario, Quebec, and British Columbia; tungsten-wolframite, from British Columbia and Nova Scotia, and scheelite, from Cariboo, B.C., and auriferous antimony ore, from Nova Scotia.

**Metallurgical Products.**—Several smelters and other reduction works have contributed exhibits, some of them comparatively large and of considerable value, of metallurgical products.

The Consolidated Mining & Smelting Company of Canada, Ltd., has sent from its smelting works and electrolytic lead refinery at Trail, B.C., lead concentrate, lead anode and cathode, lead pipe, sulphate of copper (bluestone), and other products.

The exhibits sent by the Granby Consolidated Mining, Smelting & Power Company, of Grand Forks, and the British Columbia Copper Company, of Greenwood, both in the Boundary District of British Columbia, contain copper ores, matte, blister copper from their own converters, etc. The Tyee Copper Company, of Victoria, B.C., has contributed from its works at Ladysmith, Vancouver Island, ores from a number of Coast mines, roasted and raw ore and bricks made from ore fines, matte, blister copper, etc.

The nickel-copper exhibits of the Canadian Copper Company, Sudbury, Ont., have already been mentioned. The Syracuse Smelting Works of Canada, Montreal, Que., also made a contribution of products to the Canadian exhibit.

**Coal.**—Prominence is given to the coal exhibits, the bulk of which are in a large show case in the centre of the hall, and on which is displayed the statement that "Coal is King." Another published statement is that "Canada's Coal Areas are Estimated at 100,000 Square Miles."

Samples of Western coal are large, those from individual mines weighing from 1,000 to 1,500 lbs. each. Vancouver Island collieries are represented by exhibits sent by the Western Fuel Co., Wellington Colliery Co., and South Wellington Coal Mines, Ltd., the last-named having only lately commenced production of coal on a commercial scale. From the Middlesboro colliery, Nicola District, the Nicola Valley Coal & Coke Co. has sent an exhibit of coal of good quality, while Southeast Kootenay coal fields are represented by pyramids of coal from the mines of the Crow's Nest Pass Coal Co. and the Hosmer Mines, Ltd., respectively. A similar exhibit of coal from the International Coal & Coke Company's mines, at Coleman, Alta., and some coal briquettes from Bankhead, are all that has been received from Alberta. Samples of coal from Nova Scotia are also shown in the fuel exhibit, which includes as well peat in briquettes, from Beaverton, Ont., and bituminous shale, from New Brunswick.

Coke is from the Crow's Nest Pass Coal Co.'s ovens at Fernie; from Hosmer; from Union Bay, Vancouver Island, and from Coleman, Alberta. With the fuel exhibit is a sample of tar sand, from the Athabasca River.

**Asbestos.**—"Canada produces over 90 per cent. of the world's supply of asbestos" is the claim made in connection with the fine exhibit of asbestos made here. It is stated, further, that in 1900 Canada's production of this mineral was valued at about \$748,000; for 1908 it was nearly \$2,485,000. The considerable quantity of asbestos exhibited makes an excellent display, and that much interest is taken in it is manifest from the number of enquiries made about this mineral. The asbestos shown is chiefly from Thetford and Black Lake, Quebec. The end of one of the large central cases is filled with crude mineral and products manufactured from it, and there are two other exhibits nearby, one of good samples of asbestos and the other of products. Covering for steam pipes and elbows, and for boilers; rope and wick packing; board, fibre, and cement, are the chief asbestos manufactured products included in the exhibit, which is an object lesson to many who had never before seen this mineral in its manufactured state.

**Mica.**—Both Ontario and Quebec show in quantity mica from different parts of those provinces, while British Columbia exhibits some from Tette Jaune Cache, where, however, but little has yet been done towards opening the deposits. "Canada's mica mines could supply the world's demand should occasion arise," is stated with a directness of expression characteristic of most of the claims made in connection with Canada's chief mineral resources, and which do not appear to leave room for much doubt as to their correctness.

**Graphite.**—Exhibits are from both Quebec and Ontario. Beside graphite for lubricating, packing, and other industrial purpose, manufactured products are shown, chiefly large crucibles.



**Corundum.**—Other claims made are that "Canada supplies over 85 per cent. of the world's production of corundum," and that "Canadian corundum is well known in Europe, and is being adopted throughout the world by users of abrasives." In evidence of the latter fact, wheels manufactured in Canada, Great Britain, Belgium, France, Germany, Italy, Russia, and the United States are shown. The corundum exhibited not made into wheels is chiefly from Craigmont, Ontario.

**Hydromagnesite.**—From Mavor, Ltd., of London, have been received, and are on exhibition, a number of magnesite products from Canadian hydromagnesite, these comprising bricks, cupels, furnace linings, etc.

**Other Minerals.**—Three table cases contain mananese ores from Bridgeville, Nova Scotia. Miscellaneous exhibits include feldspar and celestite, from Ontario; baryta, phosphate of lime (apatite), and ferro-limon, from Quebec; mineral paints, from Montreal; a large exhibit of talc, from Madoc, Ontario, and salt in various grades, including table salt in cans as for sale,



GRAND TRUNK RAILWAY BUILDING.

from Windsor, Ontario; pigments, petroleum and products, mineral waters, etc.

In minerals applicable to fine arts and jewellery, and in materials for common and decorative construction, there are some noticeable exhibits. Among these may be mentioned a case of cut and polished stones, chiefly from Nova Scotia, Quebec, and Ontario; a large piece of blue sodalite (a beautiful stone for interior decorative purposes), from Dungannon, Ontario; a strikingly ornamental column of jasper conglomerate, from Bruce Mines, Lake Huron, Ontario; a column of polished red and a curling stone of black granite, both from St. George, N.B., and a column of Kingston granite on a black limestone base. There are also a number of cubes of marble, both mottled and cloudy varieties, yet unpolished, so that their beautiful colours are not as yet apparent. A column of serpentine limestone (resembling Connemara marble), from Grenville, Quebec; two large blocks of gypsum (alabaster), from St. George, N.B., and some polished blue marble, from Botka Sound, Vancouver Island, are also interesting exhibits.

Building materials include some fine stone, among which are many samples of granite, syenite, quartz-andesite, sandstone, limestone, marble (both limestone and lomite), and other rocks, a number of which are from British Columbia coast quarries, though other provinces are also well represented in this division. Fire clay, from Clayburn, B.C., with numbers of fire and other bricks, sections for furnace and coke-oven arches, etc., red brick, cement materials, clays, etc., also in part illustrate the variety of Canada's resources in building and construction materials. Outside the hall a large block of limestone, from Marble Bay, Texada Island, shows the quality of the material there being made into lime in considerable quantity for shipment.

#### Other Canadian Mineral Exhibits.

The Grand Trunk Railway has in its building an excellent display of some of the chief products of Canada, among which minerals supplied by the Canadian Exhibition Branch, are prominent. Some of the prominent features of the mineral section in the Canada building are here duplicated, of course on a much smaller scale, yet the exhibits are attractively arranged and show to advantage. The ornamentation of the interior of this building is also along similar lines to those so successfully employed in the neighboring Canada building, and here, too, transparencies and photographs are used to illustrate Canada, its magnificent scenery and its industrial progress. Notwithstanding that it is necessarily very modest as compared with that made by the Dominion Government, the Grand Trunk System's display together with the building in which it is shown, is a credit to those responsible for it.

The Canadian Pacific Railway Co. has considerable space in an advantageous position in the Exposition Agricultural Building, but since its exhibits are designedly representative of the various districts through which its transcontinental line passes there is little prominence given to minerals. Further, the grains, grasses, and fruits used are more suitable for effective display in small space than commercial minerals. There are, however, some mineral samples shown in the C.P.R. Company's attractive exhibit. Toward the end of July the Vancouver Island Development League placed in this booth a Vancouver Island exhibit, in which there are some minerals. In variety, quantity and importance though, these are insignificant in comparison with mineral exhibits from the Island shown in the Canada building.

#### REPORT ON THE IRON ORES OF NOVA SCOTIA.

The Mines Branch of the Department of Mines, Ottawa, which was organized for the purpose of devoting special attention to the economic features of Canada's mineral resources, has just issued a comprehensive report on the "Iron Deposits of Nova Scotia," prepared by Dr. J. E. Woodman, until recently Professor of Geology at Dalhousie University, Halifax.

This report, which covers very thoroughly the more important iron deposits of the province, consists of 222 pages of text, 63 illustrative photographs, diagrams and maps, and a copious index. The scope and economic importance of the work may be judged from the detailed instructions given to the author, who was requested to give special attention to:—

1. Localities of iron ore deposits so far discovered, and names and addresses of owners.



2. History of development of mines and companies (if any).
3. Geological description.
4. Analyses of ores.
5. In cases of mines which have been worked, output and statistics.
6. Transportation facilities.
7. Limestone in neighbourhood of deposits.
8. State in general terms character of forest in neighbourhood, i.e., whether the supply is sufficient for mining purposes and for the production of charcoal in the event of the introduction of electric smelting.
9. Maps of mines (and drill holes, if any).

The report itself is divided into two main parts:—

Part I. deals with the geographic relations of the deposits, their mineralogy and geology, and questions relating to mining policy, bounties, and mining laws.

Part II. is entitled "Details of Iron Districts," and covers more particularly the ores of the Clementsport Basin, the Nictaux-Torbrook field, the deposits of Hants and Colechester Counties, the ores of the Western Cobequid Mountains and of Arisaig, and the ores of Cape Breton, and is replete with analyses of ores, records of bore-holes and geological sections, and other statistical data.

A second volume, covering iron ore deposits not referred to in Volume I., and devoting special attention to limestones of value for metallurgical purposes, will shortly be issued.

In view of the present condition of the iron ore industry of Canada, and particularly Nova Scotia where so much imported iron ore is being used, this report should be of special value to mining engineers, investors and others interested in the development of the iron resources of this province.

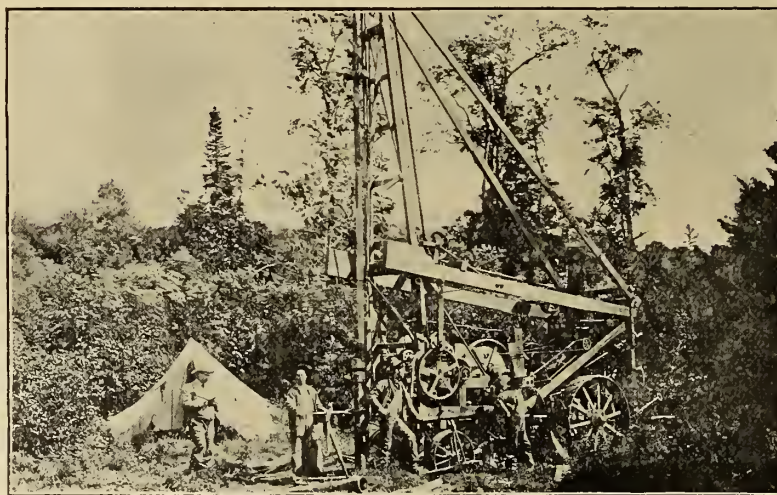
Copies may be obtained on application to Dr. Haanel, Director of Mines, Ottawa.

## MODERN PLACER TESTING.

By G. R. E. Kennedy, Sherbrooke, Quebec.

One method of testing placer ground is the use of the percussion drill. Here, as in sinking for oil, an iron casing, or pipe is driven into the ground by means of a drop weight, working on rope or cable running over a wheel at top of derrick, operated by means of a walking beam and steam or gasoline engine. One driller used by the writer is a Keystone No. 3 traction, driving a 6in. pipe, on the lower end of which is a steel cutting shoe. The machine being placed in position, the pipe is placed in a shallow hole, with earth tramped around it to hold it in place. Then, the drill

core has been drilled to within a few inches of the cutting shoe (in gravel the bit must never be allowed to go below it) the drill is pulled out and the sand pump let in. This, by powerful suction, takes out all the core that has been cut by the drill—in fact, will take out loose gravel without drilling—and this is emptied into a tub and eventually panned, though perhaps first put through a rocker. Then the driving clamps are again put on the bit and pipe driven deeper (new lengths being screwed on as required) and the process repeated until bed-rock is reached, and possibly farther



bit being screwed on to the drill stem and the driving clamps tightened on to the bit, the latter is lowered into pipe, and length of drop fixed and driving begins. The bit and stem weigh about 800 lbs. and with the Jars, 1,000 and drop  $1\frac{1}{2}$  to 2 feet striking around 50 blows per minute. When proper depth is reached, i.e. shortly after pipe gets into gravel, the driving clamps are taken off and the drill let fall inside the pipe, the operator twisting it by hand at each stroke to prevent wedging. This pulverizes the gravel, stones, etc., and cuts through boulders, when encountered. When the

When the hole is finished, a knocking head is put on the pipe (with the drill inside) and pipe is pulled by the exact reverse of the driving process, tools are loaded on to the bed of the machine, and the latter moved to the next position; for the placer has been gone over and laid out in squares, or pests placed to indicate where each hole is to be driven.

Thus, from each hole an accurate test is made. A section of the ground from surface to bed-rock, 6in. in diameter, each 6in. or 12in. as may be, of the core is pumped out or panned, and results entered in the



record book. No slumping in from the sides is possible of rich or poor layers. By putting holes over the entire property, as near together as deemed advisable, say in rows running at right angles to the flow of water, and going from side to side of the placer, and the rows from end to end, the number of cubic yards of gravel is ascertained, the depth of over-burden, the pay-streaks, if such exist, the different lays of gravel, presence of clay, boulders, etc., quality and contour of bed-rock, and average gold values, with a degree of accuracy not possible in any other kind of mining. And from the knowledge of the ground thus obtained, the kind of machinery best adapted can be judged and the cost of extracting the gold content figured on closer than the product of any manufacturing business where market fluctuation introduce an element of uncertainty unknown to the product of the placer gold, the standard of value.

It was the prospecting drill that enabled W. P. Hammon, of Oroville, California, and associates, a dozen years ago, to raise funds for dredges by means of which \$3,500,000 worth of placer gold was extracted from ground, some of it running as low as 12 cents per cu. yd., in one year, 1904. Think of what the cost of testing a large acreage by means of the 49er's shafts would be, and then the uncertainty of figures for same, and the time wasted! There are now between 30 and 40 dredges working around Oroville alone, owned by the Feather River, the Boston and Oroville, Boston Machine Shops, Butte Gold, Lava Beds, Yuba, Cherokee and other companies, some of which have lately consolidated under the management of Mr. Hammon. Probably, had you been offered stock in any of these 12 years ago, you would have smiled a knowing smile and passed by on the other side. Only a few years ago mining investments were looked upon as risky, gambling chances, and to-day a prejudice exists in the minds of those who are not properly informed, especially as to the wonderful improvements in methods and machinery, such as the development of the modern gold dredge from the pan, shovel and sluice.

To-day not a share of these companies' stock can be bought. The ground worked runs as deep as 60 and 70 feet and values from 12 cents to 27 cents per cu. yd.

The returns of a properly equipped dredging enterprise can be predicted with exactness and for years in advance, and this is due to improved prospecting methods.

Its Maker has said that "the earth is full of riches," and who will gainsay it? The rocks of more recent formation contain oil, gas, coal, etc. Older ones contain lead, iron, zinc, etc., and still older ones and their conglomerates carry the precious metals. New and wonderful finds are constantly being made, the world over. No country or section of country has or can have a monopoly of minerals. That some sections seem to have more than others is often because the inhabitants of such localities have the enterprise to investigate and develop the storehouse of wealth under their feet.

And the quickest and cheapest means for such investigation is the core drill, of which there are two kinds, the percussion and the revolving. The percussion drill does not take out a solid core, the other does, (if we except the Empire, of which more later). The revolving core drill is made in different forms, such as the diamond drill, where sharp cornered diamonds are the cutting agency, another with steel or other metal cutting teeth, and another which cuts its channel by revolving the tube upon a layer of chilled steel. But none of these are of use in soft ground, sand, gravel,

etc., and they do not give very good satisfaction in loose, sealy rock, soft coal, etc., though where the ground (rock) is suitable they give excellent results. With the percussion drill, only a perpendicular hole can be made.

The Keystone works very well on ground that it can be run over, but there is a hand prospecting drill, the Empire, that for use on placers, when the ground is soft or not accessible to the more ponderous machine, can be called truly a universal prospecting machine, and the workmanship and finish of it is all that can be desired while on account of its lesser weight, it can be transported to any desired point by man or horse power. The casing that the Empire sinks has a steel cutting shoe, but with teeth, and the casing is revolved by man or horse power, and is therefore, much more easily pulled.

In dredge mining, prospecting has been developed to a science, and the hazard and uncertainty of old methods eliminated, while ground that the 49er would turn up his nose at is made to yield immense returns, even the 49er's abandoned mines and dumps of tailings are worked over and made to pay much better than they did the first time! But in mining, as in many other things, we, in the Province of Quebec are still in 49.

### THE LOST MINE MYTH.

Every mountain range from Maine to Mexico has its mysterious lost mine fable, of which the Pegleg and the Breyfogle in Nevada are perhaps the most famous, for these two are not limited to local liars, but are told by old prospectors and newspaper reporters, from one end of the land to the other, wherever mining items interest. A company has recently been floated, claiming to have recaptured the stray Breyfogle.

Locally, in the Eastern Townships of Quebec, Orford, Stoke and other mountains have their little story, each of a man lost in the hills who picked up a rock to shy at an imaginary wolf, or grabbed a chunk of bed-rock just as he was slipping over a precipice, or uncovered untold wealth under his camp-fire, the melted metal running in tiny rivulets through the ashes (although it would require several degrees more heat than a fire of sticks could produce to melt any of the precious metals, but that is trivial in view of the fact that traces of the fire were afterwards found) but, overtaken by night, got so confused, that, after having found himself, never again could he locate the spot. Or often the exposure and hardships of the night brought on fever and the man died, leaving only his blessing and the story to his family.

In Orford, the find was copper, in Stoke, gold or silver, in Prospect Hill "a nugget as big as the yoke of an egg," strange to say, parted in the middle, half remaining in the ledge and half in the piece broken off. The time and effort spent in the vain endeavor to locate these fairy finds would surprise you. And you might as well argue with a man who thinks a hazel twig has a mysterious affinity to water, when that water is several feet under ground, as to talk sense to one struck with the lost mine mania.

In Emberton, it is the "Lost Stone Mine." and the finder carved an Indian and an arrow on a birch tree, so many paces from a range post. If you doubt the story, for \$5 or perhaps \$50 if you look easy, a native will take you to that post. What better proof do you want of the truths of the tale?



And so round each little mountain range, you will find your old inhabitant with his tale of vanished treasure, which it will be just as well for you to accept, for if you try to use reason, you will find you are up against it.

In one place, a vein of asbestos, with five (5) inch fibre, has crawled into some crevice and pulled the crevice in after it. This was not figured on when the Amalgamated put out its claim to 70 per cent. of known supply, in Quebec.

## The Influence of the Railroads of the United States and Canada on the Mineral Industry.

Abstract of Paper by James Douglas LL.D., Member, to be Read Before the Institution of Mining and Metallurgy.

As our review of the railroads of the continent bears primarily on their influence on mining, it would be interesting to determine whether these combinations affect that industry beneficially or the reverse.

The freight supplied to the railroads by the mines is far in excess of that contributed by any other branch of national activity, as will be seen from the following table:—

| Class of Commodity.           | 1900                                     |                       | 1906                                     |                       |
|-------------------------------|------------------------------------------|-----------------------|------------------------------------------|-----------------------|
|                               | Tonnage reported as originating on line. | Per ct. of aggregate. | Tonnage reported as originating on line. | Per ct. of aggregate. |
| Products of animals . . . .   | 14,844,837                               | 2.87                  | 19,002,825                               | 2.32                  |
| Products of mines . . . . .   | 271,602,072                              | 52.59                 | 435,450,476                              | 53.09                 |
| Products of forests . . . . . | 59,956,421                               | 11.61                 | 92,187,351                               | 11.24                 |
| Manufactures . . . . .        | 69,257,145                               | 13.41                 | 121,457,738                              | 14.81                 |
| Merchandise . . . . .         | 21,974,201                               | 4.26                  | 33,319,615                               | 4.06                  |
| Miscellaneous . . . . .       | 25,329,045                               | 4.91                  | 48,543,902                               | 5.92                  |
|                               | 516,432,217                              | 100.00                | 820,164,627                              | 100.00                |

Mr. Harriman distributes the minerals and metals carried by the railroads of the United States as follows. He says:—

“When we classify the mine products transported on the American railways, measuring the tonnage by that originating on each road, we find that the largest of these products is bituminous coal, of which 206,000,000 tons were transported during 1906. The other products were anthracite coal, nearly 60,000,000 tons; coke, 33,000,000; ores, 69,000,000; stone, sand, and other like articles, approximately 58,000,000; miscellaneous mineral products, more than 9,000,000.

Adding to these the manufactured mineral products we have, petroleum and other oils, 6,500,000 tons; iron, pig and bloom, 21,000,000 tons; other castings and machinery, 13,500,000 tons; bar and sheet metal, 15,000,000 tons; cement, brick, and lime, more than 27,000,000 tons. Besides these, as stated above, the railroads hauled for their own needs more than 100,000,000 tons of fuel and other materials.”

Though the product of the mines constitutes more than half the freight carried by the railroads of the United States, perhaps on that very account—taking the country at large—the rates on that class of freight are very low.

The following extract, from an address I recently gave before the Mining Congress, gives in brief the prevalent rates on coal and minerals in the different sections:—

“In every tariff, coal, coke, and the ores of the commoner metals, which have intrinsically very low value, are carried at very cheap rates. Coal itself is often carried at less than the average cost of transpor-

tation. The Chesapeake & Ohio Railroad reports that its coal rate is slightly over 4 mills per ton mile. The Baltimore & Ohio and the Pennsylvania Railroads, so far as we can gather from their tariff, carry coal at about 3.4 to 3.5 mills per ton mile. The New York Central, whose average freight rate is only a trifle over 6 mills a ton mile, carries coal at between 3 and 4 mills. When we get farther west, where traffic is less dense, rates are slightly higher. In the neighbourhood of Chicago, coal and coke rates are over 4 mills. In the Kansas City region they are about 5 mills. In the Rocky Mountains the cost of transporting coal runs up to between 5 and 7 mills. The same is true of the transportation of ores. Transportation of the iron ores of Lake Superior by rail is somewhere between 4 and 5 mills per mile. In the West, the transportation, I believe, of the ores from Bingham Canon to Salt Lake City, over a very difficult piece of grade, is as high as 7.5 mills per ton mile. But if we take the enormous tonnage which Butte offers to the railroad, we find that the ore is carried for 12c a ton from Butte to Anaconda, a distance of 25 miles (4.6 mills per ton mile), and is carried for just about 4 mills a ton mile from Butte to Great Falls, 176 miles, by the Great Northern. In the southwest we have to charge a little more than that, but railroad transportation on ore from Bisbee to Douglas, a distance of 28 miles, is 20c.”

Mr. E. H. Harriman, in an address before the same American Mining Congress, in Pittsburgh, said:—

“The products of the mines constitute the heaviest freight, and are charged the lowest rate. They are usually non-perishable, and their quick delivery is, as a rule, not urgent, except in a shortage of coal during the winter seasons.

“As a rule, the mine products are more constant in their production than any other large items of freight. As will be seen from the figures given, coal is by far the largest single item; and while the production of coal varies from year to year, only nine times since the beginning of our records of coal mining in the United States (in 1814) has the production of any one year been less than that of the preceding year, the greatest falling off recorded being a drop of 12,000,000 tons in 1894 from the production of 1893.

“On the whole, the increase in production has been so rapid and so marvellous, that on one of the important coal-handling railroads (Baltimore & Ohio) the coal transported during each of the past several decades has equalled the aggregate of that transported by it during all the preceding decades; and the ratio in the increase of production of coal for the entire country has come near following this rule for the past eighty years.



"There has been a correspondingly large increase in the tonnage production of many other important mineral materials, though in some of these the increase has not been so striking as in the case of the coal."

The freight rates on the products of the mines are lower than the average freight rate on all classes, which is computed at .78 of a cent per ton mile, the ton being 2,000 lb. I am connected with a road which runs for 463 miles through New Mexico into El Paso, Texas. It connects a coal field making most of the coke consumed by the copper industries of Southern Arizona, with El Paso, and therefore the proportion of mineral products is above the average, being 63.70 per cent. of the total.

The average freight return is, on all classes, .7253c. On coal and coke, shipped from points east, it receives as its proportion only 5.61 mills. On fuel which originates on its own road, its gross revenue is 6.58 mills.

The inference from these rates would be that a road will receive a higher toll on freight of that description originating on its own road than on the same freight coming from a connecting road. But it enjoys that advantage simply, or only, when and because it is nearer the market, for the market price of such a commodity determines in a measure the cost of carriage.\* The long haul rate is always lower than the short haul.

The long distances over which coal and minerals are carried, illustrates the intimate relation that must exist between mining and transports. Coal from Ohio for consumption at Mesaba Iron Mines must be carried about 800 miles; iron ore from Minnesota to Pittsburgh above 1,000 miles; coal and coke for copper mines in Southern Arizona and Northern Sonora, if from Colorado or New Mexico, is transported 600 to 700 miles; if from the east, 2,000 miles. Copper from Arizona to refineries in New Jersey or Maryland, is subjected to a haul by rail of 2,700 miles; copper from Montana to refineries in the east, to a haul of about the same distance; but British Columbia copper must submit to a journey of 3,000 miles.

The interdependence of the railroad and the mines and the mills on one another, and the great volume of freight carried can best be appreciated by a concrete example. There were nine buildings erected in New York last year into whose skeletons there entered 99,000 to, say, 100,000 tons of structural steel. One of these was the McAdoo Tunnel Terminal, which should be counted as two. If we assume the steel to have been made in Pittsburgh, to make it, 200,000 tons of iron ore were transported from the Mesaba Mines at the extreme western end of Lake Superior—first by railroad, then by steamer—then after a second shipment by rail for 1,000 miles to Pittsburgh. More than 100,000 tons of coal and coke were transported from the Connellsville District to Pittsburgh, and the 100,000 tons of steel were moved first to the construction shops, and thence to the site of the buildings, a distance from Pittsburgh of, say, 300 miles.

These ten buildings, therefore, contributed to traffic in raw material and the finished steel not less than 400,000 tons. The sky-scrapers being erected in every large city of the Union to replace less luxurious and commodious office buildings, and to reconstruct the business portion of San Francisco, account in great measure for the marvellous growth of the iron and steel industry during the last two decades—and a sudden fall in building helps to explain the rapid falling off in the bulk of the traffic.

### Canadian Railroads.

The Canadian railroads have had less influence on the mineral development of the continent than those of the United States, not only by reason of their lower mileage, but of the country through which the first roads were built and the distribution of Canadian mineral deposits. Nevertheless Canada has not been backward in railway building, for, per head of population, she has more miles of railroad than the United States. The population of the United States in 1900 was 76,303,387, and her railroad mileage was 193,345, or one mile to 395 of the population, whereas Canada's population in 1901 was 5,371,315 and her railroad mileage was at that date 18,140, or one mile to 290 per head of population.

The first railroad was a short line of sixteen miles built in 1835 to connect the St Lawrence at Lachine with St. John, and thus secure during the summer months steam communication with New England. This was extended to Rouse's Point in 1850. Other short lines were constructed from inland points to connect with river navigation, making a total mileage in 1852 of only 222. The Great Western, however, in 1852-53 opened its line from Suspension Bridge to London, and in the following year extended it to Windsor. In the same year the Grand Trunk connected Point Levis with Richmond, in Lower Canada, at which point it made connection with its through line from Portland (Maine) to Montreal. The Great Western was subsequently purchased by the Grand Trunk, which thus secured the traffic of the Peninsula—the Garden of Canada.

### The Grand Trunk Railroad.

To-day the Grand Trunk has 3108 miles of single track, and 696 miles of double track; but till the Grand Trunk Pacific was organised and commenced construction, the company never ventured beyond the fertile lands of Quebec and Ontario. The design of the Grand Trunk Pacific therefore bespeaks a complete reversal of the traditional policy of the company, which should make it a worthy competitor of the Canadian Pacific.

A railroad was projected to run from the sea to Quebec, while the boundary between Maine and Canada was in dispute. It even reached the stage of incorporation, for a bill passed the legislature of New Brunswick, authorising the construction of the St. Andrew and Quebec Railroad Company. The settlement of the boundary dispute by Lord Ashburton ceded to the United States that portion of New Brunswick west of the St. John's River through which the proposed railway would have been built, and through which ran the actual post road for the transportation of the mails between Quebec and St. John and Halifax.

It is, perhaps, not strange that the boundary disputes affecting the extreme north-east and north-west frontiers of the British possessions in North America should have excited the building of railroads and influenced their location. In both instances the disputes were settled in favour of the United States. Ultimately both the railroads were built as originally proposed, but the political motive being removed, their construction awaited the demands of trade.

### The Intercolonial Railroad.

The main line of the Intercolonial, 686 miles in length, with its branches and equipment, cost, when opened to traffic, \$21,500,000, not a heavy capital on which to pay fixed charges. Nevertheless, the railroad, as a commercial enterprise, has never been successful.



Government ownership, at any rate in Canada, is not conducive to economy and strict management. The Intercolonial has been helpful to the coal and iron interests of the Maritime provinces. But they have been less helpful to the railroad than coal or iron districts on the continent, for on both the Island of Cape Breton, and on the main land the ore deposits and the fuel are on or close to the seashore. The coal production of the whole Dominion in 1907 was 10,511,426 tons, of which Nova Scotia alone mined six and a-half millions, all of which can avail itself of water transportation, whether to the Western Provinces, to United States, or the West Indies. Vancouver coal, also, is mined near the Pacific.

It is significant of the unsettled character of much of the country through which Canadian railroads run that, in the same sub-division of traffic, 1,460,019 cords of wood are stated to have been transported. (p. 61 of R. R. Statistics for 1906).

The pig-iron industries of Nova Scotia, as well as her coal mines, contributed but little freight to the railroad. The iron ore from the extensive but superficial deposits on Bell Island in Conception Bay, Newfoundland, is loaded directly on ship board, and discharged without railroad carriage on the docks of the Dominion Iron and Steel Company at Sydney. The Nova Scotia Steel and Coal Company's works at New Glasgow are built on an arm of the sea; and the Londonderry Works are within a few miles of an inlet of the Bay of Fundy. In 1906, Nova Scotia mined 5,750,660 tons of coal, and made in her furnaces 366,455 tons of pig iron; but of this production there was carried by the Intercolonial Railroad (p. 140 of Railroad Statistics), only 1,182,128 tons. Her mines and furnaces, however, on this very account, enjoy greater geographical advantages than any others on the Continent. They are as independent of land transportation facilities as those of Great Britain, whose mining and metallurgical industries, situated on or near the sea, were active before railroads were built.

The Intercolonial through the Province of Quebec, as far as Point Levis, clings to the St. Lawrence, where there are no mining operations, and from Quebec westward, to its junction with the Grand Trunk at St. Rosalie, it runs through low swampy or agricultural land. It gave a winter outlet for the coal and iron of the Lower Provinces to Quebec and Ontario, till the Canadian Pacific, with its shorter route and more vigorous management, entered into competition.

#### The Canadian Pacific Railway.

The Pacific Railroad Act, passed in 1872, provided for the creation of a company to build a railroad from the south shore of Lake Nipissing to the Pacific coast. It was to be commenced before July, 1873, and completed before 20th July 1881. Land grants were made of alternate blocks through Manitoba, British Columbia and the North-West Territories, twenty miles deep, not to exceed 50,000,000 acres. The subsidy in money was \$30,000,000. The cost of the line to Lake Nipissing, which was built by Government, was considered as part of the subsidy.

During the same session a number of companies were incorporated to build the whole or sections of the road, one of which, under the Presidency of Sir Hugh Allan, and under the legal management of the Hon. J. J. C. Abbott, was proved to have contributed largely to the Administrator's electoral fund. As a result the

Conservatives were ousted from power by the Liberals under Mr. A. Mackenzie.

The existing Canadian Pacific Co. was thereupon organised, but the road was not completed without further assistance from Government, which at a critical period lent the Company \$100,000,000. This has been repaid.

The railroad was divided into three natural divisions—that from Lake Nipissing to Port Arthur—600 miles, running for some distance not far from the Height of Land between the Lakes and Hudson Bay, through a comparatively barren and rugged country. Second, a level section built for 400 miles through a swampy, well-wooded district, till it entered the woodless prairie in Manitoba, which extends to the base of the mountains. The length of this second was about 700 miles. And third, the mountain section of about 650 miles across the Rocky Mountains to the Pacific.

The first section completed in 1883, was that from Winnipeg to Port Arthur, to which construction material could be supplied at one end by steamers on the lake, and at the other via the branch to Emerson on the United States boundary by the St. Paul, Minneapolis and Manitoba Railroad. A year afterwards the Eastern Division was opened; but it was three years more before the Rocky Mountain Division was completed.

The Canadian Pacific to-day owns 9155 miles of single track and 1209 miles of double track. It has extended its tracks into the Maritime Provinces to the sea; it purchased from the Quebec Government the North Shore Railroad, to reach Quebec, which is the summer port of its Atlantic line of large boats; it runs into Chicago over the Wabash tracks, and from Moose Junction into St. Paul over its own rails, there to connect with the Soo Branch, which rejoins the main line at Sudbury.

It has crossed the Rocky Mountains by a second line through the Crow's Nest Pass, and has built in southern British Columbia, Manitoba, Saskatchewan and Alberta, about 4000 miles of branches.

Its influence of mining in Ontario and in opening up the mineral resources of the West has been momentous. In this respect its benefits were felt before the road was completed. Although many hundred miles of railroad tunnels have been driven through mountains, and thousands of miles of railroad cuts made through ore-bearing rocks, this enormous amount of exploratory work has seldom resulted in exposing ore—even in Chili, in the Cordilleras of the Andes, or in the Rocky Mountains. A railroad cutting, however, by the Canadian Pacific, at Sudbury, revealed one of the large deposits of nickeliferous ore which, with the mines of New Caledonia, virtually supply the world with nearly three-quarters of its consumption of a metal which has become so useful in the arts of both war and peace now that these large deposits permit of its cheap production.

Though the Canadian Pacific main line and its Algoma branch run through mineral-bearing rock, in which the old Bruce Mine, managed by John Taylor & Sons, and the famous Silver Islet Mine were worked no other very large traffic-yielding mineral district except Sudbury has been opened on their main line between the Ottawa and the Rocky Mountains.

But the Timiskaming and Northern Ontario Railway—a road built by the Ontario Government—has aided, if it was not the parent of, the marvellous silver district of Cobalt. When this branch is extended



about 80 miles to Lake Gowganda, it will open up another short strip of the inhospitable country, which may prove the first step towards Labrador. Alaska, Northern British Columbia, and the Yukon were considered worthless, because the farmer denounced them as unfit for agriculture, till the prospector and the miner cultivated them for mineral crops. And the same will probably prove true of that vast forbidding, forested country, the Labrador Peninsula, including the whole ridge between the St. Lawrence water system and Hudson Bay.

But the Canadian Pacific, in supplying the population of the treeless Prairie Provinces with coal, provided the settlers with a commodity as necessary to growth as the land to which it gave them access. British Columbia owes its advancement to the same railroad. There, as everywhere else, the first railroad was hailed as a benefactor, but soon it was cursed as a tyrant, and competition with reduced rates invited. This change of attitude by the customers has been sometimes excusable. But none the less British Columbia owes more than it can now appreciate to the men who built the road at the risk of all they possessed. That it has been successful is due to good management and to the stability of fair rates imposed by the Government of Canada. Under these the mining interests of British Columbia have certainly flourished.

The silver-lead mining commenced in 1886 in the Slocan District, and the first shipments were made in 1887—the year the Canadian Pacific reached the coast. The first shipments of copper were 324,680 lb., in 1894. The shipments in 1907 were 42,900,488 lb. The most productive mines are in the Boundary District, close to the State of Washington. They are making money out of an ore whose average yield is much under 2% of copper, supplemented by a little gold and silver. This has been made possible only through the assistance of the railroad, which to-day is as much a necessary part of a metallurgical establishment as the smelting furnace, for high-grade ores of all the metals, except iron, have become scarce, and the world's demands must be supplied from ores which did not rank as such half a generation ago. The Boundary District is served by both the Canadian Pacific and Hill's Great Northern from across the border. The alternate line of the Canadian Pacific through the Crow's Nest Pass was built to supply the furnaces at Rossland, Nelson and Boundary, with the coal and coke from Fernie and other mines, and ovens in the East Kootenay coal fields.

#### The Canadian Northern Railroad System.

A third trans-continental road, the Canadian Northern, is being built by instalments, and almost without observation. It also has already promoted mining and metallurgy to an eminent degree. It is known as the Mackenzie-Mann Railroad, from the two contractors who originated it by the purchase of a short isolated road in Manitoba, and under whose wise administration it is being expanded as traffic warrants.

The management says:—

"The Canadian Northern is primarily a Western railway. It began in Manitoba and is mainly operating in the Provinces of Manitoba, Saskatchewan and Alberta. Its growth has been phenomenal because the country that has produced it is phenomenal. There was no railway in it before 1880. The total at the end of last year was 6216 miles, of which, after eleven years' existence the Canadian Northern was operating 43 per cent. The growth of other railways in the

prairie provinces averaged 129 miles per annum. The Canadian Northern averaged 246 miles per annum."

While the original road was built westward from Gladstone, its nucleus, a point on a very fertile district 60 miles north-west of Winnipeg, it was extended eastward from Winnipeg to Port Arthur, in Ontario, by a southern route, and in order to pass south of Rainy Lake it had to run for 67 miles through the United States. It therefore opens up territory on both sides of the Line untouched by the Canadian Pacific which, for military reasons, never left Canadian territory and, therefore, was located to the north of the chain of lakes which define the boundary between the two neighbours. The Canadian Northern road re-entered Canada at Rainy River. A branch leaves the main line at Fort Frances for Duluth.

The main line runs through an iron region, the extension northward of the famous Mesaba iron deposits. It contains great possibilities and at least one actual development, the mines of the Atikokan Iron Co., 142 miles from Port Arthur, whose furnace plant has been erected in Port Arthur. The forests are expected to supplement the local freight supplied by the mine.

The Canadian Northern operates 3390 miles in the north-west, of which only 1265 constitutes the main line from Port Arthur to Edmonton; the balance is in branches. From Edmonton it is proposed to approach the Pacific by following the Brazeau River through the Brazeau River coal fields.

But the ambition of Messrs. Mackenzie and Mann seems to be rather to attain success by developing the resources of the country they traverse than to pose as transcontinental magnates. They look to wheat and lumber as fodder for their Western Canadian Northern, and to lumber and mineral for freightage of their road from Winnipeg to Ottawa if they ever build it through. For instead of attempting to span the continent from sea to sea by a continuous railroad, they have built of the Canadian Northern of Ontario only 367 miles to connect the Iron Mines of Moose Mountain with their shipping docks at Key Harbour, on Georgian Bay, and their furnaces at Toronto, leaving a gap of over 500 miles between Port Arthur and the Moose River Mine, and another gap between that point and Ottawa.

The same policy has been pursued in Quebec, the Canadian Northern Quebec Railroad consisting of a road from Ottawa to Montreal, and thence to Quebec through the Laurentian Forest at a distance from the St. Lawrence. Lumber and wood pulp are as yet the principal freight of this section. Riviere a Pierre the main line joins the Lake St. John and Chicoutimi railroad, which has been absorbed into the system, and by which it enters Quebec. This purchased road depends substantially on lumber and wood pulp for its traffic.

The easternmost section is again a fragment, or rather two fragments—a coal road, the Inverness Railway and Coal Co., a line of 60 miles in Cape Breton, a coast line from Halifax to Yarmouth, and a branch from Lunenburg to Port Wade, under the title of the Halifax and South Western Railroad. When the Quebec Bridge actually spans the St. Lawrence River at Cap Rouge, the long gap between that point and the Atlantic seaboard may be built, but the heart of the continent evidently offers a more tempting field to these enterprising men than its rim.

Unless all signs fail, the section west of Port Arthur, which already nourishes the Atikokan Iron Mines and their furnaces at Port Arthur, will stimulate



the search for, and the development of, other iron deposits. The international boundary line, a mere political fiction, cannot have cut from Canada her share of nature's good gifts.

Meanwhile, the heavy expenditure the Canadian Northern is making on the Georgian Bay at Key Harbour, the lake terminus of their Moose Mountain branch, in ore pockets and docks to handle 8,000 tons of ore a day, express their faith in the extent of the iron deposits at Moose Mountain.

The Sudbury deposits and their known northern extension; the opening of these large iron mines in the interval between Sudbury and Cobalt; the extraordinary wealth of Cobalt; and the discovery of minerals of the same class at Lake Gowganda, must encourage railroad building to the northeast, and give courage to the Government, as builders of the Grand Trunk Pacific, and to the enterprising promoters of the Canadian Northern to run their tracks with all speed through the wilderness north of Lake Nipigon.

The Canadian Northern Company claim for the shipment of ore to the United States a certain triangular traffic advantage which is important if it can be carried out. They say that "there is a remarkable strategic advantage in the location of the Moose Mountain Mines. In the first place, they are over 500 miles nearer Cleveland and Pittsburg than the Minnesota ranges, and vessels trading between Duluth, or Port Arthur, and the coal ports of Lake Erie, can load up with wheat for Key Harbour, pick up ore for Cleveland, and return to Duluth or Port Arthur with coal, thus in one round trip handling three great commodities of commerce, whereas in trading between Duluth and Cleveland, it is impossible to handle more than two."

#### The Quebec Central Railroad.

But one of the longest of the second class roads, the Quebec Central, has the distinction of carrying 85% of the world's supply of asbestos. And the same serpentine rocks which yield the asbestos contain chrome iron, about 6000 tons of which in ore and concentrates were shipped last year to the United States. The same road runs through the beautiful Chaudiere valley, which was the scene of a feeble gold excitement a generation or more ago. And had it been built, it might have reversed the ill-fortune which attended the copper mining operations of the English and Canadian Mining Co., under its various re-organisations. For tributary to the road are very large deposits of low-grade copper ores in slates of the Quebec Group, which may be worked to a profit under better methods, and with cheaper transportation than of yore. If that time ever arrives, the eastern division of the Grand Trunk will also derive some benefits from mining, for these copper-bearing slates are widely distributed through the Eastern Townships of the Province of Quebec.

#### Canadian Railroads\* and Canadian Mining.

Postponing the consideration of projected roads in the mineral development of Canada, let us try and gauge the influence of existing railroads. The Canadian Railroad statistics for 1908 have been framed on the pattern of those of the Interstate Commerce Commission of the United States, and, therefore, an accurate comparison can be drawn of the operation of the two national systems.

The distribution of freight in the two countries is as follows:

|                            | United States in 1906.           |        | Canada in 1908. |        |
|----------------------------|----------------------------------|--------|-----------------|--------|
|                            | Tons.                            | %      | Tons.           | %      |
| Products of agriculture... | 70,201,720                       | 8.50   | 9,306,967       | 14.91  |
| Animals .....              | 19,002,825                       | 2.32   | 2,472,358       | 3.92   |
| Mines .....                | 435,450,476                      | 53.09  | 22,626,237      | 35.92  |
| Forests .....              | 92,187,351                       | 11.34  | 12,972,236      | 20.49  |
| Manufactures .....         | 121,458,735                      | 14.81  | 6,655,719       | 10.56  |
| Merchandise .....          | 33,319,615                       | 4.86   | 2,008,267       | 3.18   |
| Miscellaneous .....        | 48,543,902                       | 5.92   | 6,938,135       | 10.09  |
|                            | 820,164,627                      | 100.00 | 63,019,900      | 100.00 |
| United States.....         | 3,652 tons per mile of railroad. |        |                 |        |
| Canada.....                | 2,740                            | " " "  |                 |        |

The growth of the mining industry may be gauged by comparing the freight statistics of 1908 with those of 1907.

They are as follows:—

|                                       | 1907.      | 1908.      |
|---------------------------------------|------------|------------|
|                                       | Tons.      | Tons.      |
| Anthracite (most of it imported) .... | 1,635,128  | 3,735,141  |
| Bituminous coal .....                 | 11,905,068 | 12,320,584 |
| Coke .....                            | 547,303    | 845,767    |
| Ores .....                            | 2,209,860  | 952,353    |
| Stone and sand .....                  | 2,082,336  | 2,538,330  |
| Other products .....                  | 178,985    | 243,004    |

The total freight of all classes carried during those two years were: In 1907, 56,497,885 tons; in 1908, 63,019,000 tons.

The three roads or rather systems, described above comprise as notable a proportion of the Canadian railway mileage, as do the 15 or 16 groups, which we have classified, of the total United States mileage. If we deduct the 9155 miles of the Canadian Pacific, the 3694 of the Canadian Northern, and the 3569 of the Grand Trunk, excluding the mileage of the Grand Trunk Pacific, and add the 1540 of the Intercolonial, we have a total of 17,953, leaving less than 5000 miles to be distributed among 86 small companies, whose average length of track is, therefore, only 52 miles.

In the year 1906, the two products of the mines which gave to the railroads of the United States this large mineral traffic were coal and iron ore. Unfortunately the distribution of her coal mines places the Dominion at a disadvantage compared with her neighbour, for the manufacturing progress of the United States is largely due to the wide distribution of its coal, and that of the Dominion is hampered by the absence of its own fuel from the more populous Provinces. There is none, and none is likely to be found in Quebec or Ontario, and Manitoba possesses only a small field of lignite, the eastern extension of the Souris Basin, which supplies her domestic fuel.

Further west, in the Province of Saskatchewan, a larger area of the same lignite beds has escaped erosion, and in Alberta, south of Edmonton, lignite underlies a territory at least 100 miles from north to south and 100 miles from east to west. The same is known to extend, though to what distance is doubtful, still further north.

Of this grade of coal there was mined in Saskatchewan, in 1907, 153,900 tons, and in Alberta about 600,000 tons. But of the cretaceous coking coal there was also mined in Alberta 547,623 tons, and of anthracite 235,596 tons. This came from the eastern extension of the British Columbia coal fields. It is to reach these that the Crow's Nest Pass Line of the Canadian Pacific has been built, and they are tapped from across the border by Mr. Hill's Great Northern. The production



of coal from these Rocky Mountain mines and from the coal fields on Vancouver Island, reached in 1907, 2,364,898 tons.

The coal fields of the extreme west of the Dominion will supply the needs of an active mining, metallurgical and manufacturing population, and the coal of Nova Scotia and New Brunswick is more than sufficient to reduce the iron of their known deposits, and to keep busy their manufacturing population. But Ontario, which is the centre of Canadian industry, is 800 miles from the nearest western coal, and 500 miles from the coal beds of the maritime provinces.

On the other hand, that busy hive, New England, is in the same sad plight as Quebec and Ontario. It possesses, outside of a small and worthless deposit of anthracite in Rhode Island, no coal, but is dependent for its fuel on the distant coal-fields of Pennsylvania, Maryland and Virginia; and yet coal is essential to the maintenance of its manufacturing position.

These discrepancies and disadvantages are really political and not natural, for the coal of Cape Breton can reach Boston by sea, without any land transportation, and Ontario is divided from the excellent coking coals of Pennsylvania and Ohio by a narrow strip of land and the waters of Lake Ontario. Reciprocity would remove these political obstacles and restore the natural industrial balance if human selfishness did not interfere and obstruct.

As it is, the coal supplied to the railroads of Quebec and Ontario yields them comparatively little traffic, and they would gain more by the impulse which cheaper fuel would give to metallurgy and manufacturing in Ontario and Quebec than they lose by foregoing the carriage, when navigation is closed, of coal from the maritime provinces.

When we turn to the next mineral product, which constitutes part of the 53% of the total traffic of the United States railroads, viz., iron ore, we find a situation analogous to that in Canada with regard to fuel. 75% of the iron ore which makes the 25,000,000 tons of pig ore is transported nearly a thousand miles from Lake Superior to the coals of Pennsylvania, or about 600 miles to the fuel of Illinois and Lake Michigan. That shipped to Pittsburgh has to submit to a railroad haul of over 50 miles to the head of Lake Superior, to be there transferred to ship, and carried for 700 miles to ports on Lake Erie, where it is again transferred to cars to be hauled to the furnaces at Pittsburgh, which has become the most important manufacturing centre of the United States, simply because of its vicinity to the best coking coals of the Republic.

The iron ores of Canada, as we have shown, through the efforts of the Canadian Northern, can now be exchanged across the Lakes for the Pennsylvania coal which Ontario needs. We have seen that the situation of the iron ores and the coal in the maritime provinces favour the metallurgical industry at the expense of the railroads, but the iron ores of Ontario must submit to a long haul, and should afford a source of heavy freight.

#### The Grand Trunk Pacific.

The Grand Trunk Pacific is being built throughout to open up and develop almost unexplored sections of the Dominion. After crossing the St. Lawrence at Quebec, the road, as in the case of the Canadian Pacific and the Canadian Northern, geographically subdivides itself into three sections—the eastern, the middle and the western; but the Grand Trunk Pacific really recognizes only two divisions, the eastern and

the western, for the following reasons. The Dominion Government has undertaken to build as the Eastern Division the road from Moncton, in New Brunswick, to Winnipeg, in Manitoba, and lease it to the Grand Trunk Pacific Co. for 50 years on a rental of 3% on the cost of construction, the rental not to be payable for three years after final construction, and therefore to be due for only 43 of the 50 years. From Moncton, New Brunswick, the road will use into Halifax the Intercolonial Railroad, and the Grand Trunk Pacific will build a shorter line to the sea coast, terminating in St. John, New Brunswick.

Through New Brunswick and eastern Quebec to the Cap Rouge Bridge, where it will cross the St. Lawrence, the new road, though built by the Federal Government, will parallel for long distances its own road, the Intercolonial. But beyond Quebec it will strike north, running within some 60 or 70 miles of James Bay, an arm of Hudson Bay, thence keeping in its course through Ontario to the north of Lakes Nipissing and Nipigon, and far to the north of Lake Superior. It will reach navigation on the Lakes Ontario and Superior by north and south branches, which the Grand Trunk Pacific, not the Government, will build. It is located more or less parallel with the projected Mackenzie & Mann, the Canadian Northern road, until Lake Nipigon is passed; but thence onward to Winnipeg it will open up a wilderness which it is only reasonable that the Canadian Government should assist in exploring.

From Winnipeg the western division is sub-divided into two sections. The first section, the prairie, extends for 916 miles to Wolf Creek, beyond Edmonton. The mountain section extends thence to Prince Rupert on the Pacific, 840 miles. The prairie section is already built straight into Edmonton across the prairie, while the Canadian Northern makes, in connecting these same two towns, a long curve to the north, in order to reach the valley of the Saskatchewan.

The terminus is near the mouth of the Skeena River, by which the road descends to the sea. The town was laid out on picturesque and sanitary lines, in advance of the advent of the track, on a land-locked arm of the sea, constituting a large and safe harbour.

The Government aids the Company in building the western division by guaranteeing the interest on \$13,000 per mile of the first mortgage bonds on the prairie section, and on three-fourths of the cost of the mountain section wherever that may be. The Grand Trunk guarantees the balance of the bonds.

It is a bold undertaking, but not as hazardous as was the building of the Canadian Pacific, when both the agricultural and mineral resources of the northwest were unknown quantities, and the volume of the Oriental trade which would be deflected to the Canadian routes was problematical. This factor of trans-continental traffic will, however, be effected by the Panama Canal. It already feels the influence of the Tehuantepec route.

#### Possible Mineral Resources of North-Western Canada.

The question of prime interest to us is, what the mineral resources of this large slice of the continent penetrated by the Grand Trunk Pacific really are, and whether they are likely to be reached by its main line or branches. The eastern division now being built by the Dominion Government, after leaving Quebec, as we have said, runs along the height of land, and after crossing the affluence of the Ottawa continues almost



to Winnipeg on the Hudson River slope. The recent discoveries in this comparatively unknown land are encouraging. Near Lake Chibogomo, in the Province of Quebec north of Lake St. John, minerals of the useful metals, in what are believed to be commercial quantities, have been discovered in the Huronian rocks. Of the interval between Chibogomo and the silver regions of Cobalt nothing is known.

The millions which have been taken out of Cobalt, since 1903, certainly encourage prospecting. Cobalt owes its discovery to the approach of the railroad which the Ontario Government, desiring to connect by rail the older parts of Ontario with the new, projected, as the Timiskaming and Northern Ontario Railroad from North Bay towards the north. During the construction of this railway the silver veins of Cobalt were discovered, the first finds being within a few yards of the right of way. Further west, nickel ores are known to extend north of Sudbury into the northern range. Iron deposits have been found north of the Moose Mountain; the rocks of the Keewenaw series north of Lake Nipigon are known to be gold and iron bearing. Therefore this section may add largely to the mineral wealth of the Dominion. But the imagination may with reason be given license to run wild in conceiving what the rocks of the extreme north and west of Canada may have kept in store for us.

The railroad will cut across the same ranges which have enriched Montana and British Columbia; which concealed the riches of the Klondyke, and, which it may be assumed, contain the same ores which are already being actively exploited in Alaska. British Columbia made last year in copper, 60,000,000 lb., and Alaska promises from the mines of the Copper River district to again drench the world with a deluge of

copper. It is not, however, the first time within our recollection that that catastrophe has threatened to overwhelm us. A branch line laid out from Hazelton, on the main line of the mountain division, through northern British Columbia and into the Yukon, terminating in Dawson, will, when completed, open up about five hundred miles of this mountain region.

The resources of the Territories of Mackenzie and Keewatin, as well as those of the great Labrador Peninsula, re-christened "Ungava," have never been taken into account. The area of this inhospitable region is startling, and its resources may prove to be so also.

The areas of these unknown sections of the continent are, of the—

|                       |       |                    |
|-----------------------|-------|--------------------|
| Yukon Territory       | ..... | 196,326 sq. miles. |
| Mackenzie             | ..... | 532,635 "          |
| Keewatin              | ..... | 456,996 "          |
| Ungava                | ..... | 349,109 "          |
| Franklin, supposed to | about | 500,000 "          |

If, when the railroad gives access to Lake Chibogomo in Quebec, the prospects do not prove to be delusive, a branch intersecting Labrador will have to be built. Iron deposits of some magnitude are known to exist on the eastern shores of Hudson Bay, but of the resources of the vast territories of the Yukon, Mackenzie and Keewatin we have only vague rumours. Prospectors who have wandered down the Mackenzie tell of great lead deposits exposed upon its banks. We know with some degree of accuracy of the large extent of the petroleum tar sands, constituting in places banks 200 ft. high, from Dr. Bell's report to the Canadian Geological Survey, and from his papers in the proceedings of the Canadian Naturalist and the Transactions of the American Institute of Mining Engineers.

## IRON ORE DEPOSITS OF NOVA SCOTIA.

Notes from Report by Dr. J. E. Woodman, Issued by the Mines Branch, Department of Mines, Ottawa.

In May, 1906, Dr. J. E. Woodman, at that time professor of geology at Dalhousie University, Halifax, N.S. was instructed by Dr. Haanel, Director of Mines Branch, to make as complete investigation as possible of all important iron ore deposits so far discovered in Nova Scotia. Dr. Woodman was directed to deal first with deposits that are favourably situated as regards transportation.

Instead of attempting a rapid and superficial reconnaissance of the whole province, Dr. Woodman selected a few localities and reported upon these in detail. These localities were chosen as being typical of the various methods of occurrence of the ores, and either of present or prospective economic importance. As not all of these districts could be covered in one season, a second report will deal with those omitted from the first.

Part I., General Considerations, includes chapters on the geographic relations of iron ore deposits, the iron minerals, general geology of iron deposits, mining policy, bounties upon native iron ore production, and titles to iron ore.

Part II. presents details of several iron ore districts in the Clementsport Basin, the Nivtaux-Torbrook Basin, the Treassic trap, the Devonian deposits of Hants and

Colchester, the ores of the Western Cobequids, the partly bedded ores of Arisaig and Malignant Cove, the ores of Whycocomagh and Middle River, and of Barachois.

While we cannot afford space even to enumerate the subjects and individual occurrences touched upon by Dr. Woodman, there are several sections that call for more or less extended notice.

Geographic Relations of Iron Ore Deposits.—"With a long coast line and several remarkable national shipping centres, with no part of the country remote from rail communication or inaccessible through topography, the province is especially well situated, . . . providing the best gateway into Canada from Europe for imports or exports, and acting as a manufacturing centre for the West. . . . From the standpoint of manufacture and transportation, what the Atlantic commonwealths are to the United States, Nova Scotia is to Canada."

General Distribution of Ore.—Iron ore is widely distributed throughout Nova Scotia.

On the south side of the Bay of Fundy detached small deposits are found all the way from Brier Island to Cape Blomidon, and on the south shore of Cobequid Bay towards Truro. South of this line of deposits are



the more persistent and important ores of the Clements-port and Nictaux-Torbrook fields.

Detached deposits occur eastward through Pictou County, and through Guysborough County north of the granites and gold-measures. On the south flank of the Cobequid hills is a persistent line of ore bodies stretching into Pictou County. In Antigonish County the large Arisaig field occurs on the coast, and to the south are many small deposits.

In Cape Breton many widely separated deposits have been found, some of commercial promise.

Throughout the province the numerous iron ore deposits are either in close proximity to tidewater or can easily be brought into connection with it.

**Relation to Fuel.**—Like the iron ore, the coal fields of the province are widely distributed, and are capable of supplying fuel at a number of smelting centres. The Sydney and the Glace Bay mines supply the plants of the N. S. Steel & Coal Co., and the Dominion Iron & Steel Co. On the west coast of Cape Breton are the Chimney Corner, Inverness, Mabou, Port Hood, and Richmond fields. In the centre of the province is the

sufficient amount of flux can be obtained for any probable need.

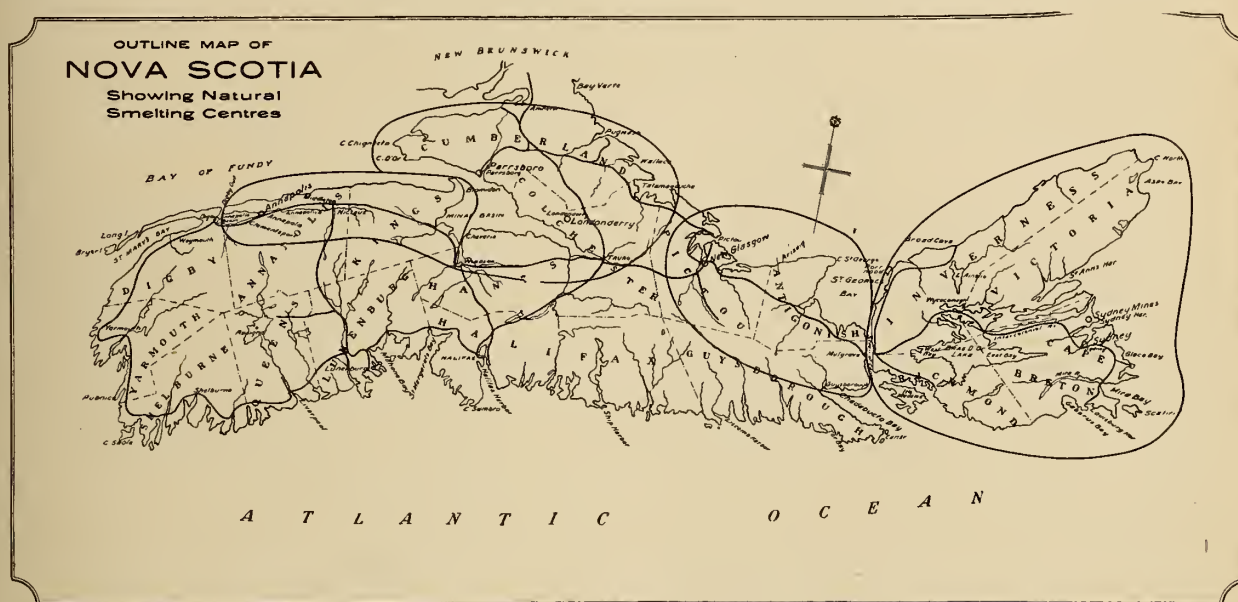
**Possible Smelting Centres.**—From the standpoint of an adequate supply of suitable iron ore, flux, and fuel, with cheap transportation for all these materials to the furnace, and proper shipping facilities for both incoming and outgoing freight, there are four sections that are favourably situated. The cost of labour is uniform throughout the province, and thus does not require consideration.

These four sections indicated on the accompanying map, are:—

(1) A western section in Digby and Annapolis Counties, with the town of Annapolis as its industrial centre.

(2) A west central section, serving Kings, Colchester, and Cumberland Counties, and having Londonderry as a centre.

(3) An east central section, embracing Pictou, Antigonish, and Guysborough Counties, with a focus somewhere in or near the Pictou coal field.



Pictou field. In the Cumberland County field is a line of small collieries stretching from Joggins Mines, on Chignecto Bay, eastwards. Here also are the Springhill collieries. The Londonderry Iron & Mining Co. obtain their fuel chiefly from Springhill and Pictou.

**Relation to Fluxes.**—Limestone on the one hand, and dolomite and ankerite on the other, constitute the two groups of fluxes. The first contains little or no magnesia, the second and third are high in that element. In addition, the ankerite carries a considerable percentage of iron.

The limestones are found in the pre-Cambrian and Cambrian, of Cape Breton, and in the Ordovician, Silurian, Devonian, and lower carboniferous throughout the province. The dolomites occur in the pre-Cambrian; and the ankerite, which is practically an iron-bearing dolomite, is found abundantly in the Londonderry district, and in variable quantity throughout the Devonian area in Colchester and Pictou Counties. In Cape Breton, limestone abounds within reach of shipping.

Only a small proportion of the limestones and dolomites are fit for metallurgical use. But even so, a suf-

(4) An eastern division, including all of Cape Breton, with its centres at Sydney and Sydney Mines.

**Relation to Ore and Metal Markets.**—There appears to be a possibility that Nova Scotia may yet be able to supply Eastern Canadian demands with her own ores. Every ton of iron or steel that can be made from native ores at a cost to meet existing conditions of trade can be sold. Whether or not iron and steel can be made from native ores for export, there certainly will be room in the near future for all the metal that can be produced for manufacturing purposes in Eastern Canada, especially in the Provinces of Nova Scotia and New Brunswick.

(To be Continued.)

#### PEAT FUEL INDUSTRY IN CANADA.

The importance of the peat fuel industry to the central portion of Canada, where coal fuel is non-existent and its importation so comparatively costly, requires no demonstration.

The Mines Branch of the Department of Mines, Ottawa, issued a year ago a report on "Peat and Lig-



nite, Their Manufacture and Uses in Europe," with the object of giving to Canadians as complete a review as possible of this industry in those countries in which it has been most successfully carried on.

This report is now followed by a bulletin entitled "The Investigation of the Peat Bogs and Peat Industry of Canada During the Season of 1908-09," by Erik Nystrom, M.E., Peat Expert. This bulletin comprises 25 pages of text, and includes six large-scale maps of the following peat bogs:—

1. Mer Bleue, near Ottawa.
2. The Alfred Peat Bog, about 40 miles from Ottawa.
3. The Welland Peat Bog, about 6 miles north of Welland.
4. The Newington Bog, on the New York & Ottawa Railway, and about 40 miles from Ottawa.
5. The Perth Bog, a mile and a half from Perth.

6. The Victoria Road Bog, about a mile from Victoria Road station on the Midland Division of the Grand Trunk Railway.

The bulletin contains a descriptive report of each bog, showing the location, area and structure, and giving an estimate of the available supply of peat fuel, with records of analyses, calorific values, etc., and should be of particular interest to those engaged in, or connected with, the development of Canadian peat resources.

A fuel-testing plant is now being erected at Ottawa, in which the value of peat for the production of power gas will be demonstrated, and the Department proposes to carry on a very thorough investigation of this subject.

Copies of the above bulletin and report on peat may be had on application to Dr. Haanel, Director of Mines, Ottawa.

## LEAD SMELTING AND REFINING PRACTICE AT TRAIL, B.C.

From the Bulletin of the Canadian Mining Institute, by A. J. McNab.

(Continued from issue of July 15, 1909.)

The roasting department has six 26' circular H. & H. furnaces, with two more building. These furnaces have revolving hearths, making one revolution in three minutes, and stationary cast-iron rabblers which work the material out of the furnaces in two hours. They have one firebox 6' x 3' on the periphery, the feed coming in the centre, thus gradually approaching the hotter part of the furnace. The material goes into the roasters with from 14 per cent-17 per cent sulphur and comes out with about 8 per cent -8.5 per cent. The capacity is from 38 to 45 tons per day, depending on the amount of sulphur in the material charged and the elimination desired. Our experience is that for good desulphurization in the pots the roast should not have over 9 per cent sulphur, 8 per cent being much better. The temperature of these furnaces must be carefully regulated so that there is heat enough to roast the charge properly though not enough to fuse it, as this will rapidly crust up the furnaces. The roast should consist of small uniform semi-fused globules showing neither lime rock nor ore. The furnaces discharge into the boot of a chain elevator, which drops the roast through a spray of water into a brick bin. This spraying of the roast is a very important part of the process, as it would be impossible to obtain a good product in the pots without doing this, the principal part would then consist of fines which had not fused at all. The function of the moisture (the roast should have about 5 per cent) seems to be a mechanical one, preventing the blast from blowing through too freely, thus making blow holes and localizing the heat. It keeps the heat in the pots until they start to burn uniformly and the temperature gets sufficiently high to insure the fusing of the charge.

The roast is conveyed in cars from the brick bins to iron hoppers over the converters. The lead converting plant consists of 15 converters 8' 8½" in diameter, holding a charge of 10 tons each. The diaphragms used

are cast iron, cast in four sections and bolted together; these sectional diaphragms are much more serviceable than those cast in one piece, as the expansion and contraction is taken up in the joints, and they do not crack. Cast-steel diaphragms were tried, but proved a failure, as the heat bulged them. The converters are operated as follows: A few slabs are thrown into the converters with a shovelful of glowing coals from the firebox of the roasting furnace, a small blast turned on until the fire burns briskly, then the converter is filled from the hopper above, a blast of from 6-8 oz. being turned on and gradually reduced, until when the fire is at the surface and the charge nearly burned only about 2 ozs. is used. Instead of using slabs for starting it can be done with a hot charge, whichever method is preferred. When the charge is burned out, which takes on the average about 8 hours, the converter is dumped and the fused mass falls on a cast-iron cone, which breaks it into several large pieces. These are broken small enough to enter 20 x 20 Blake crusher, which crushes it to a 6" ring. The product is elevated from this crusher and goes direct to the furnace charge bins.

The heat, used in pot roasting is, of course, supplied by the oxidation of the sulphur, iron, etc., in the charge. The reaction between the sulphides, sulphates, and oxides doubtless aids considerably in the elimination of the sulphur, but just to what extent it is difficult even to guess. Some lead is always reduced, the amount varying a good deal, being higher with a high percentage of lead. The function of the lime in the roasting and converting is a much disputed point on which the writer will not venture any opinion. Of course, roasting and converting can be done without any at all. We regularly roast our low grade copper matte with say 15% copper, 27% sulphur, and 56% iron, in an O'Hara or Godfrey furnace, down to 10-12%, and then convert it in H. & H. converters of the usual type, getting a good product carrying from 1-3% sulphur. We also



treat mattes carrying up to 25% lead in the same manner, and obtain a good roast, though the product is more massive and is harder to break. So that if the lime performs any peculiar chemical function it is one that can be performed as well by iron.

The blast furnace plant consists of two furnaces, one 45"x140", with an average capacity of 150 tons of ore per day, one 45"x160", with an average capacity of 170 tons. Another furnace in the process of construction is 45"x215", which we anticipate will put through 240-250 tons of ore daily. In speaking of capacity, we refer to tons of ore, instead of tons of material as is the general practice on this continent. The general practice in this particular, is very misleading, and in fact, conveys very little information, as flux, matte, slag and other by-products might vary anywhere from 15-40% of the charge. For instance, one day our 45"x160" furnace smelted 181 tons of ore, but 261 tons of charge, exclusive of fuel. Another day it made about the same ore tonnage—180—and only made 230 tons of charge. In the first instance the charge carried a lot of by-product, 31%, in the second only 21% with the same ore tonnage. The capacity of the furnace should be figured really on the revenue it produces, and as by-products carry no revenue, they should not be figured.

The furnaces are of the standard type with brick crucibles, and are water jacketed from the crucible to the top of the bosh, above which is a firebrick shaft. The smaller furnace has fourteen 4" tuyères, all in the sides, of the furnace and the larger one has sixteen tuyères. The tuyères are 20" centres; but we are reducing the distance on our new furnace, making it 15" with smaller tuyères. The height of column measured from tuyères to feed floor is 17.5' and the blast used is 32oz. The lead well is of the continuous overflow type and the matte and slag are tapped from the furnace, the matte settling out in a large receiver and the slag overflowing into the granulating launder.

The furnace charge consists principally of H. & H. roast, which is never under 75% and averages 85% of the charge. Besides the roast, the charge carries a small amount of oxidized lead ore and sufficient dry silicious ore and lime rock for the slag desired, also from 100-300 lbs. of furnace slag to keep the charge open and the furnace uniform. The coke averages about 12.5% of the charge, exclusively of slag and easily smelted by-products, varying with the roast and the quality of the coke. The lead in the charge will average about 40%, excluding coke and slag. We have run as high as 45% and with good roast, that is, suitable analysis and low sulphur, no trouble is experienced. But if conditions are imperfect, especially if the sulphur in the roast gets high, trouble begins at once, the slag gets "mushy" and will not run, and if something is not done the furnace will stop. High sulphur is bad at any time, but with a high lead charge it cannot be tolerated, as it is not possible to smelt such a charge economically. For a 40-45% lead charge the sulphur should not exceed 4% and is much better if only 3%. Even with no serious furnace trouble like a threatened freeze-up, the lower the charge in sulphur, the faster it will run for the same analysis, and of course the lower the matte fall, thereby saving money. The difference in speed between a roast of the same analysis, high in sulphur and low in sulphur, is very marked, and a change in the amount of sulphur in the charge, corresponding to a difference of 2% in the matte fall, will easily make a difference of 10-20 tons of ore smelted per day. The sulphur elimination in our blast furnaces,

with a fairly close charge will be from 30-40% due to a considerable extent to reactions between sulphides, sulphates and oxides.

The slag aimed at is a modified  $\frac{3}{4}$  slag,  $\text{FeO} + \text{MnO}$  24—30%,  $\text{SiO}_2$  31—33%,  $\text{CaO}$  18—20%. No attempt is made, however, to follow any definite slag type, as no advantage is apparent from doing so. We try to keep our silica from 31—33%, as we find that by going below 31% we do not gain in speed; in fact, the slag is sticky and does not tap so easily and we can profitably smelt silicious ore to keep it up to this. Above 33%, however, we find it slows up the furnace so that the extra silica is no longer profitable. The  $\text{FeO}$  may vary anywhere from 25—30%, without varying either the speed of the furnace or the slag loss, the lime between 18 and 20%, though the lead in the slag gets less with the higher lime, but the difference is small. We do not like to run our lime higher than 20%, as the breast gets hard. This is dangerous with a fast running furnace as a little carelessness will slag the tuyères. When the charge gets high in sulphur the lime is reduced at once to 17—18%, as lime accentuates any trouble due to "mushy" slag. Also if the slag gets high in zinc the lime is reduced proportionately. The zinc runs from 7—12%  $\text{ZnO}$ , giving us little trouble, if not over 12%. Alumina runs from 8—16% with an average of about 11%, when it gets high (13—16%) it seems to make a heavier, less liquid slag and slows the furnace up, but at no time have we had any serious trouble from this element. In values, the slags average about 0.4 oz. silver per ton and 1% lead.

Usually scrap iron to the extent of 1—1.5% of the charge is used, this helping very materially in the reduction. If this is not used the slags are higher in lead, though the silver content is not raised. There is a tendency to higher slags with a faster running furnace, especially higher values in lead. That is, a furnace putting through 125 tons of ore daily will run cleaner slags than the same furnace running 160. That is, provided the roast and other conditions of charge are not so bad as to prevent reduction. High sulphur in the charge will cause slow running but will also cause high slags. This would not be expected since sulphur is a powerful reducing agent. The reason probably is that a high sulphur charge causes the jackets to crust badly and accretions to form higher up the shaft, making the furnace hang and smelt too high up, curtailing the opportunity for reduction. Our furnace campaigns average 6—7 months. Accretions form on the shaft of the furnace, gradually filling it up, generally beginning on the ends and growing towards the centre. In six or seven months time they have usually grown so that while the furnace may be, and usually is, smelting as much if not more ore than at the beginning with good slags, yet the area of the upper part of the shaft is so restricted that the heat comes up very readily if not carefully fed and increases the volatilization loss so that it is more economical to blow them out. About 70 tons of bullion per day is produced by one furnace. This runs from the lead well into steel coolers, two being provided for each furnace with a capacity of about 3 tons each. The bullion is cooled and drossed here, the dross being skimmed off and put back through the furnace, the bullion is tapped into moulds which make pigs of about 90 lbs. weight; these are sampled and sent in railroad cars to the refinery. An average monthly analysis of the bullion is as follows:—Cu. 22%; Fe. tr., Mn. nil; Zn. 0.098%; Sb. 0.32%; As. 0.28%; Ni. nil; Co. nil; Cd. nil; Bi; 0.0133%; Ag. about 100 oz.; Au 1 oz.;



Pb. 98.5%. Arrangements are now being made to cast the anodes for the refinery direct from the cooling kettles, thus saving remelting.

**Refining Melting Plant:**—The bullion from the smelter is melted in 50 ton steel kettles and pumped by a centrifugal pump into a receiver from which pipes, with plug valves, lead to 10 vertical anode moulds. A 1½" cast iron pump of the ordinary type is used and is driven by a 2 h.p. electric motor. The moulds are filled by opening the valves, the speed of discharge being regulated easily with these. The moulds are of steel, immersed in water to keep them cool, and have a movable head which forms the head of the anode and is lifted out, carrying the anode with it. The head is freed from the anode by the blow of a hammer and reset in the moulds ready for another tap. The anodes are handled from the moulds to cars by a crane; the cars hold ten anodes, set vertically, and are run into the tank room, two cars are placed together, and the 20 anodes lifted off at once by a 10-ton electric crane and placed in the tanks, each tank holding 20 anodes. The cathodes are melted in two 50-ton steel pots; the lead, after skimming, is raised by a centrifugal pump into a receiver, flowing from there by a movable spout into a circle of moulds, making pigs of about 100 lbs. weight. The lead is all moulded into pigs of this size with the exception of that for the Chinese trade, which is made into pigs of a special form, weighing 180 lbs.

The cathode starting sheets are also cast in this building. In the early days of the plant, these sheets were made electrolytically, a thin sheet of lead being deposited on paraffined steel sheets in tanks set aside for this purpose and operated at a low current density. When the deposit of lead was of sufficient thickness, the cathodes were taken out, the sheets stripped off, flattened out, rolled on cathode bars and were ready for use in the tanks. This method was found to be not only costly, but to give weak unsatisfactory sheets. It was found that if lead was poured on an iron or steel plate, with a smooth surface and inclined at an angle, it would chill as it flowed down the plate, giving a nice, uniform sheet, the thickness depending on the temperature of the lead and the angle of inclination of the plate. The starting sheets have now been made on this principle for some years, giving a much cheaper, and a more satisfactory sheet in every way than by the old method. The casting machine is very simple, consisting of a ¾"—steel, surfaced plate the size of the starting sheet, set at an inclination of 1.8 inches per foot. An iron trough of more than sufficient capacity to carry the lead necessary for one sheet is hinged at the other end. Enough lead is ladled from the pot into this trough, which is then turned up so that the lead will flow down the plate, forming the sheet as it flows, the excess spilling over. The sheets are trimmed, very little trimming being necessary, and lifted from the machine on to a car and the machine is ready for the next cast. The sheets are taken into a special room at the south end of the tank department and there straightened and hung on ½"x¾" copper bars by just bending the sheet around the bar once. They are then placed on a car holding 21, sufficient for one tank; of course the sheets are suspended by means of the copper bars from frame work built up on the car so that there will be no danger of them getting bent. These sheet cars are run on tracks between the different rows of tanks and the sheets are put in by hand.

The tank room contains 240 tanks of 3'x8'x3' 6". These are made of 4" coast fir, lined with asphalt and

give very good satisfaction, leaking but little. They are arranged in 6 rows of double tanks, running the length of the tank room, and in three series of cascades; one cascade of nine tanks in length on one side of the pump room launder, and two cascades of six and five tanks in length on the other side. The pump tanks which are near the centre of the building are built of fir, and are asphalt lined, similar to the electrolytic tanks. The solution flows from the last tanks of each cascade in an asphalt lined launder to the lower pump tanks, the pump raising the solution from these into tanks set high enough so that it will have plenty of head to carry it to any part of the building. 1½" hard rubber pipes carry the solution from these tanks to the first tanks of each cascade, ¾" pipes conveying the solution from tank to tank. The circulation enters the tank at the top and leaves it at 7" from the bottom.

Each tank has 20 anodes and 21 cathodes, the latter being a little longer and wider to prevent short circuiting. The tanks are normally operated with a current density of 16 amperes per sq. ft. of cathode area, requiring, with 12% SiF<sub>6</sub> and 5% lead in the solution, a voltage of 0.32 per tank including all contacts. The loss of voltage in the contacts is small, being about 0.02 in all. The anodes are set with 4⅛ inch centres, the cathodes being set midway between. Only one crop of cathodes is taken at present, two having showed no advantage. With a normal current density a tank is worked out in eight days, about 15% of scrap going back to the melting pots. Most of the slime adheres to the anode scrap. This is scraped off in a special tank, the scrap washed and returned to the melting pot. Some slime, of course, falls off in the electrolytic tanks, these being cleaned out once a month. The current efficiency is from 85% to 90%, the losses being due to short circuiting in the tanks, and to floor leakage.

The electrolyte used is, of course, lead fluosilicate with free fluosilicic acid. The average composition will be about 12% SiF<sub>6</sub> and 5% to 6% lead, having a specific gravity of from 1.17 to 1.19. This gives a stable electrolyte, the losses being small. Losses are due to leaks, to solution not worked out of the slimes and to chemical decomposition of the solution, HF and SiO<sub>2</sub> being formed. Some loss is probably also experienced in the evaporation of the wash waters, though H<sub>2</sub>SiF<sub>6</sub> is supposed to concentrate to a high percentage, with no loss at the temperature used. The H<sub>2</sub>SiF<sub>6</sub> used is made at the plant; CaF<sub>2</sub>, H<sub>2</sub>SO<sub>4</sub> and SiO<sub>2</sub> in the proper proportions being mixed and heated in a closely covered, large cast iron pan. The fumes are passed through a series of towers, having at first a spray of water and later dilute acid descending. This H<sub>2</sub>O unites with the fumes forming H<sub>2</sub>SiF<sub>6</sub>, the charge being so proportioned that sufficient HF is generated to dissolve the H<sub>2</sub>SiO<sub>3</sub> formed. The solution is kept circulating until it is of sufficient strength, usually 30% SiF<sub>6</sub>, the little H<sub>2</sub>SO<sub>4</sub> it contains being taken out with lead dross, and the clean acid added to the electrolyte as required.

Under proper conditions, little trouble is experienced in making good lead. An average monthly analysis representing about 2,000 tons is as follows: As., nil; Bi., nil; Zn., .0005%; Ag., 0.0013%; Cu, 0.00075%; Pb., 99.9938%; Fe., 0.00075%; Sn., 0.0001% Sb., 0.0028. The silver runs from 0.1 to 0.5 oz., attributable to small particles of slimes floating over to the cathode settling on the projections of the latter and being plated in. As a general rule, the smoother the deposit, the freer it is from impurities. The first deposit on the sheet is



usually very smooth, getting rougher as the cathode gets heavier. The smoothness of the deposit varies with the voltage, the lower the voltage, the smoother the deposit; it also depends somewhat on the amount of glue used. From .05 to 1 lb. of glue per ton of lead produced is added to the solution daily. The function of this glue does not seem to be understood beyond that a reducing action is required. If no compound like glue is used, the lead deposited will be spongy, soft, and not coherent. In fact, it would be practically impossible to operate, as the tanks would all short circuit within a very short time.

The slime from the tank room is transferred in copper cars, to the wash tanks, and agitated with hot water, the wash waters resulting from this operation being evaporated in steam coil evaporators to the specific gravity of the electrolyte and returned to the tank room. The slimes are practically washed clean, the loss of electrolyte due to retention being very small. After washing, the slimes are filtered, dried in large cars, by being run into the furnace flue, and charged into a water-jacketed reverberatory furnace, lined with magnesite brick. An analysis of the slimes would be Ag., 35%; Sb., 25%; As., 20%; Cu., 8 per cent; with a small amount of Fe, Bi, SiO<sub>2</sub>, and at times traces of Te and Se. The impurities are oxidized off and doré metal 960-975 fine silver + gold, results. This is ladled into moulds and parted with sulphuric acid, the silver being shipped 999 fine and the gold 995. The blue-stone manufactured as a by-product is 99.5%, CuSO<sub>4</sub>, 5H<sub>2</sub>O. At present neither the antimony nor the arsenic are recovered. They were recovered for some months, a year ago, but owing to the fact that the percentage of antimony in the bullion has dropped from 1% to 0.3%, and the price of antimony from 25c. to 7c., it is no longer profitable. However, the plant is arranged that this may be done when conditions require it. The process is as follows: The slimes are boiled

with sodium polysulphide, which extracts from 80% to 90% of the antimony and 50% of the arsenic. The slimes are filtered, the solution electrolyzed in iron tanks having lead sheets as anodes and steel sheets as cathodes using a cathode density of 8 amperes per square foot with a normal voltage of 1.5 per tank. The antimony deposits on the steel sheets and on the tanks, which are also connected as cathode; dense, hard deposits up to 3/4" in thickness being obtained. When the deposit begins to loosen on the sheets, they are lifted out, the antimony scraped off and the sheets returned to the tanks. The antimony contains up to 2% arsenic, which is taken out with alkali fluxes, when it is melted or casting. The solution goes into the tanks with 4.5 grams antimony per 100 cc's, and comes out with from 0.5 to 1 gram. It is then sufficiently concentrated in steam coil evaporators, to make up for any increase of volume of the solution due to the agitation with steam, and used again with the addition of a little more sulphur for treating a fresh batch of slime. During electrolysis some of the Na<sub>2</sub>S is oxidized to sodium thiosulphate; this loss amounts to, about 30 lbs. of 30% Na<sub>2</sub>S per ton of bullion carrying 1% of antimony, if no regeneration is used. Regeneration may easily be effected by crystallizing the sodium salts out of the spent solution and reducing to sulphide with carbon.

The slimes, after treating with Na<sub>2</sub>S, are filtered, roasted in a furnace of the muffle type and treated with 10% H<sub>2</sub>SO<sub>4</sub>, which extracts 90% of the copper and from 10% to 75% of the silver, depending on the thoroughness of the roast. The solution, after filtering, is boiled with copper plates to precipitate the silver, and used again, or if the copper content is sufficiently high, is pumped to the bluestone plant for crystallization and recovery of the copper. The residue is melted in an oxidizing atmosphere with a little coal or silica to break up the PbSO<sub>4</sub>, doré bullion of 505 to 960 fine resulting, which is parted as usual with H<sub>2</sub>SO<sub>4</sub>.

## BOOK REVIEWS.

### A NEW GERMAN WORK ON MINERAL DEPOSITS.

Mineral deposits, and especially ore deposits, have received much attention from writers of books for many years. Comprehensive treatises are to be found in the German, French and English languages. During the last four or five years, for instance, there has been published the well-known book by Dr. Beck, of Freiberg, entitled "The Nature of Ore Deposits." This book has been translated into English by Mr. Harvey Weed. More recently a work of the celebrated economic geologist, the late Professor Stelzner, of Freiberg, entitled "Ore Deposits," was edited and published by Professor Bergeat. These books of Beck and Stelzner can almost be said to be epoch-makers. A third work, entitled "Deposits of Useful Minerals and Rocks, according to form, composition and origin, is now going through the press in Germany.\* It can be considered to be an international work, since its authors are the Director of the Geological Survey at Berlin, and one of the members of his staff, namely, Professors Beyschlag, Krusch and Vogt in their work:—

Norwegian writer on ore deposits, Professor J. H. L. Vogt, of the University of Christiania. This work is to be published in three volumes. The first half of the first volume, entitled "Ore Deposits: General Notes On," has been received. The preface is dated May, 1909.

While this part of the first volume deals only in a general or introductory way with the subject it is of considerable interest. Probably the part of the volume which contains the most original matter is that in which is given the authors' classification of ore deposits. The classifying of ore deposits appears to be always a subject of live interest. Many men have proposed classifications.

The following is the classification to be used by Professors Beyschlag, Grusch and Vogt in their work:—

#### I. Deposits of Igneous Origin.

##### A. Oxide ores.

- (1) Chrome iron ore group.
- (2) Titaniferous-iron ore group.
- (3) Iron and apatite-iron ore group.

##### B. Sulphide ores.

- (1) Nickeliferous-pyrrhotite group.
- Pyrites group.

\*Die Lagerstätten der Nutzbaren Mineralien und Gesteine nach Form, Inhalt und Entstehung.



- C. Native Metal Group.
  - (1) Nickel-iron group.
  - (2) Platinum group.
- II. Contact Deposits.
  - A. Oxide Ores.
    - (1) Iron ore group.
  - B. Sulphide Ores.
    - (1) Lead-zinc and copper ore group.
- III. Veins, Irregular-shaped Deposits, and Metasomatic Deposits.
  - (1) Tinstone group.
  - (2) Apatite vein group.
  - (3) Mercury-silver ore group.
  - (4) Young gold-silver ore vein group.
  - (5) Old gold ore vein group.
  - (6) Lead-silver-zinc ore vein group.
  - (7) Metasomatic-lead-silver-zinc ore group.
  - (8) Antimony ore group.
  - (9) Iron ore vein group.
  - (10) Metasomatic iron ore group.
  - (11) Manganese ore vein group.
  - (12) Metasomatic-manganese ore group.
  - (13) Copper ore vein group.
  - (14) Metasomatic-copper ore group.
  - (15) Pyrites vein group.
  - (16) Metasomatic-pyrites group.
  - (17) Native-copper group.
  - (18) Nickel-copper-arsenic ore vein group.
  - (19) Nickel-silicate vein group.
- IV. Ore Deposits (especially sediments).
  - A. Iron ore group.
    - (1) Lake and bog-ore deposits.
    - (2) Oolitic-iron ore.
    - (3) Coal and clay-iron-stone.
    - (4) Chamosite and thuringite.
    - (5) Magnetite and hematite.
    - (6) Iron-sand deposits.
  - B. Manganese-ore deposits.
  - C. Copper-schist group.
  - D. Fahland group.
  - E. Pyrite group.
  - F. Witwatersrand group.
  - G. Sulphide-lead-zinc group.
  - H. Antimony ore group.
  - I. Group of tinstone and noble metal placers.

This book, like most German works, is well printed. It is curious, however, that while in many respects, especially in binding, German books usually far excel those published in America, the illustrations are on the whole much inferior. Reproductions from photographs

in German books are usually poor when compared with those in the similar class of books in this country.

LITHOS.

**The Mining Law of Canada.** By Alfred B. Morine, K.C., LL.B. 737 pages. Price (half calf), \$7.50. Canada Law Book Company, Ltd., 32-34 Toronto Street, Aoronto.

We have frequently wondered at the absence of an up-to-date hankbook on the mining law of Canada. The need of such a volume has become more and more apparent.

Mr. Morine's book is comprehensive and thorough. The statistics and regulations of the Dominion, and the statutes of Ontario, British Columbia, and Quebec form an appendix.

The following table of contents conveys a fair idea of the scope of the work:—

Chapter I.—Mining Terms and Phrases.

Chapter II.—Part 1, Laws in Force. Part 2, Dominion Legislation. Part 3, Provincial Legislation. (a) Manitoba, Alberta, Quebec, Nova Scotia and New Brunswick; (b) Ontario; (c) British Columbia.

Chapter III.—Part 1, Crown Lands. (b) Indian Lands; (c) Railway Belt. Part 2, Railways and Highways.

Chapter IV.—Capacity to Work, Sell, Lease or License. Part 1, Extent of Rights. Part 2, Capacity to Lease. Part 3, Partnership and Companies.

Chapter V.—Contracts. Part 1, Making. (a) Statute of Frauds; (b) Part Performance. Part 2, Enforcement. (a) Statute of Limitations; (b) Specific Performance. Part 3, Terminating. (a) Rescission.

Chapter VI.—Mining Licenses and Mining Leases. Part 1, (a) Bare Licenses; (b) Profits a Prendre; (c) Leases. Part 2, (a) Parcels; (b) Term; (c) Covenants; (d) Forfeiture and Re-entry; (e) Reservations and Exceptions.

Chapter VII.—Part 1, Easements. Part 2, Fixtures.

Chapter VIII.—Part 1, Employer's Liability.

Chapter IX.—Wrangful Abstraction. Criminal Offences.

Chapter X.—Part 1, Assessment. Part 2, Registration.

Glossary.—Appendix I.—Statutes and Regulations of the Dominion, and Statutes of Ontario, British Columbia and Quebec. Appendix II.—Working Forms.

## INDUSTRIAL NOTES.

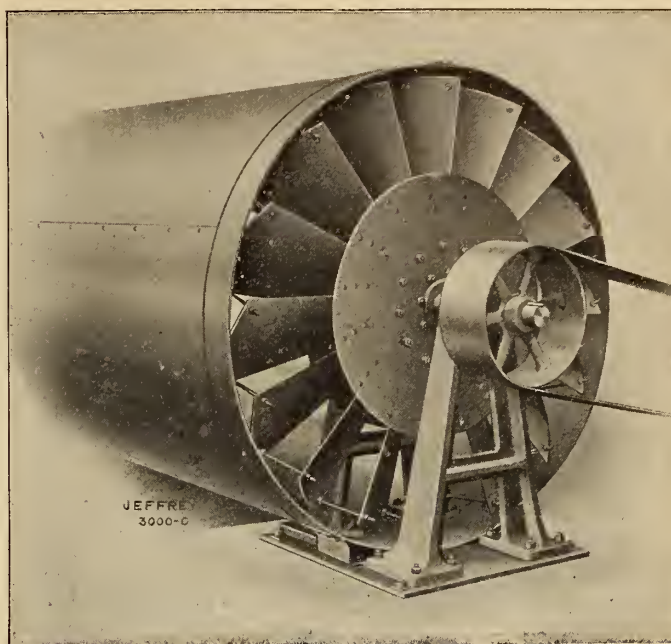
The B. Greening Wire Co., Hamilton, have instructed their architect, Mr. W. A. Edwards, of the same city, to prepare plans for a new Wire Rope Factory. It will be a one-story concrete and brick structure, 124 ft. x 112 ft., with saw-tooth roof construction. The flooring will be solid concrete, so as to withstand the weights of heavy machinery and large reels of cable. It will be an up-to-date factory in every respect. Orders have been placed for additional rope machinery of the very latest design. It is expected the new mill will be completed and machinery installed by 1st November next. The present rope mill will be used as an extension of the Wire-Working Branch of the busi-

ness, and will provide much-needed room for the rapidly growing demand for their Wire Guards, Garden Fencing and Bordering, Factory Lockers, etc.

### JEFFREY PROPELLER MINE FAN.

The Jeffrey Manufacturing Company, since placing upon the market its centrifugal fan for the ventilation of coal mines has received many inquiries for a type of fan suitable for developments that do not justify the installation of a centrifugal fan. This led them to investigate thoroughly the action of the ordinary disc fans commonly used in such cases. A prolonged series





of tests and experiments, with a disc fan located at Columbus, developed that the present type of disc fan was inefficient when working against considerable pressure, for the reason that the air forced backward by the resistance would re-enter the fan near the centre of rotation, where the velocity of the blades is very slow, as compared to the velocity at, or near the periphery of the wheel. This action would cause a churning of the air through the fan as a large proportion of the air discharged near the periphery of the wheel would merely flow back through its centre.

It will be noticed by reference to the above cuts, that the Jeffrey Propeller fan is provided with a heavy solid driving disc which prevents the air from re-entering after it has been discharged from the blades of the fan. This feature is a decided improvement over the common form of disc fan and the efficiency of the fan is further greatly augmented by the fact that the air on the intake side is given a centrifugal action near the centre, and is then discharged in a horizontal direction

from the spiral deflecting blades. These blades are riveted between two discs at the most efficient angle, and the outer ends of the blades are drawn in to a spiral shape by adjustable stay rods, so that the blades have practically the same pitch at the outer edge as they have at the periphery of the disc and consequently discharge the air at practically the same velocity over the entire discharge surface of the wheel.

The fan wheel is mounted upon heavy cast iron stands which are bolted down upon a steel base making the equipment self-contained. The bearings are of the double ring oiling type, lined with genuine babbitt and provided with large oil reservoirs which necessitates oiling but once a week.

This fan is well adapted for ventilating small operations and most practical for boosting along feeble currents in larger ones. It is fully illustrated in a neat bulletin No. 23, issued by the Jeffrey Mfg. Co., Columbus, Ohio, which will be mailed upon request.

## SPECIAL CORRESPONDENCE

### NOVA SCOTIA.

**August 4.—The Glace Bay Strike.**—At the time of writing the U. M. W. A. strike at Glace Bay enters upon the fifth week of the most uncalled-for, insensate and wanton struggle that has ever disgraced the annals of labor in Cape Breton.

The output of the Dominion Coal Company's mines for July was, in round figures, 136,000 tons, this being 200,000 tons less than it would have been had wiser counsels prevailed. The loss of output involves a loss to the mining community of about \$200,000 in wages, of \$25,000 to the Nova Scotia Government in royalties, and a loss to the shareholders of the Dominion Coal Company of the profit which would have been earned on a turnover of half a million dollars, which in consequence of the strike, will be diverted to another market, and may not easily be recovered. Three cargoes of American coal have been delivered to the Steel Company at their piers, which adjoin the loading piers of the Coal Company. If the strikers needed an object

lesson in the direct result of their actions upon the coal trade of this island, they have no need to travel far from home to see one.

The final fate of the strikers is indicated by the company's outputs, which have risen from 2,700 tons on the second day of the strike to about 7,000—or half the maximum—at the conclusion of the fourth week. Each day records a steady gain, allowing of course for occasional and local dislocations caused by accidents and holidays, and a steady stream of newcomers are reporting at the mines for work, in addition to which there is a slow returning of strikers to their work.

Our previous estimate of the number of adherents in the mines of the company was 1,700 men and boys. This estimate was confirmed by a parade which was held by the strikers on Saturday, the 31st of July. Some 1,900 men and boys walked in this procession, and it included every man the U. M. W. A. could muster. It also included many men who never worked for



the company in their lives, and some of the "born-tireds" and "never-sweats" who usually attach themselves to parades of this kind. The usual working force of the Coal Company at this season of the year is about 7,000 men. Working about and in their mines, the company have at the present time a daily force of 3,000 men, to which must be added another 1,500 men, employed on the railway, in the shops, and other subsidiary operations of the company in Cape Breton. This leaves 2,500 men unaccounted for, and presumably on strike. The difference between the 2,500 men out of employment and the number who paraded in this procession is 600 men, who are the victims of lawlessness and ceaseless intimidation.

The intimidatory methods used by the strikers are new to Cape Breton. One favorite form of intimidation is the terrorizing of the wives and families of men who are at work, and this at times has reached such a pitch that men did not dare to

years of age, going to his sister's funeral, was slugged into unconsciousness by a U. M. W. A. picket, despite protestations of his sad errand. The U. M. W. A. disclaim officially all connection with these varied forms of outrage, but people comment caustically on the fact that the defence of these people in the magistrate's courts is made by lawyers associated with and paid by the U. M. W. A. The leaders of the U. M. W. have laid the powder-train and fired the bomb; are they not responsible for the results of the explosion? If they call a strike and cannot control the strikers, are they not responsible for the misdeeds of their followers? So far, however, the general public has seen no reason to disconnect the leaders of the U. M. W. A. with the tactics of their followers, and they have seen much to confirm an opposite belief. It is a coincidence, if nothing more, that the happenings which have accompanied strikes of the U. M. W. A. in other parts of this continent should make their appearance for the first time in Cape Breton simultaneously with the calling of a strike by the U. M. W. here, and the presence of U. M. W. leaders in Glace Bay.

As the strike goes along it becomes more than ever evident that it was not a genuine one, but an artificial agitation created and bolstered up by U. M. W. A. money and the trained strike-breeders of this predatory organization. The strike has not arisen out of oppressive grievances, or out of a dissatisfaction with existing conditions, but it is the child of U. M. W. A. politics, and part of a carefully thought-out plan to obtain control of all the mines of Eastern Canada for the United Mine Workers of America. These U. M. W. gentlemen were wise in their day and in their way. They saw and marked well the inveterate attacks which certain Nova Scotian papers from time to time make upon the coal operators of the province, and they evolved a scheme to detach and break up the membership of the P. W. A. through the medium of party politics. This is a weapon which the U. M. W. A. have used many times before to-day, and in the particular instance under review they have displayed astute generalship, having made unconscious and willing catspaws of certain aspiring members of the Conservative party. Whether in the long run the U. M. W. A. are going to dish these political aspirants, or whether the last-named gentlemen are going to dupe the Americans seems uncertain, but between them both it is certain the strikers are going to be shamefully deceived and led astray. Whether the miners who have obeyed the irade of the U. M. W. A. to strike know it or not they have merely been the pawns in a game of political chess. Unfortunately, however, this game has involved the stability of the industrial fabric of this province, and bids fair to discredit for many years the fair name and financial credit of the Town of Glace Bay. But what is this to men who live in Kansas, U.S.A., or thereabouts?

The only serious argument which the U. M. W. A. have yet used to induce men to join them is the value of a big and strong union as a fighting force, compared with that of a small and weaker union. They have used this argument for all it is worth, with all the embellishments which so readily suggest themselves to the wordy demagogue. But is size the real test of the strength of a union? Is not unity the main source of strength in such organizations? We have all seen the loosely-made giant succumb to the attack of a smaller, but compactly knitted opponent. The U. M. W. A. lacks homogeneity and unity. It is full of warring cliques, and ere long will fall to pieces by reason of its own internal dissensions. The larger portions of the coalfields of the United States are non-unionized, and in many of the coal districts there the U. M. W. A. is a thoroughly discredited and impotent body, if it is in existence at all. It is in itself a confession of weakness when a union that boasts of such a large membership as the U. M. W. A., and of funds reaching into tens of millions of dollars (this is President McCullough's statement, not our own) should desert its own proper sphere, migrate to a remote place such as Cape Breton, and fasten itself upon one devoted corporation. Strong and progressive unions do not attack and attempt to destroy



MILITARY GUARD, WITH MACHINE GUN.

leave their families unprotected or exposed to the tender mercies of the strikers and their families, that are more than cruel. Boycotting has been indulged in, and instructions have been issued by the U. M. W. A. locals to boycott tradesmen whose views are suspected to be opposed to those of the U. M. W. A. Threats have been made to the proprietors of boarding-houses whose boarders were at work, and they have been ordered by the U. M. W. A. to turn out all such objectionable persons. All kinds of secret and unmanly intimidation have been resorted to, and in addition there has been open lawlessness, the use of physical force by pickets, and assaults on workmen going to and from their work. As readers of the Canadian newspapers are aware, there has been one serious attempt to dynamite the house of an official of the company, and two other minor attempts of a similar kind on the houses of workmen. One old man, over 76



galler unions. However that may be, this time the U. M. W. have caught a Tartar, as time will prove.

The necessary legal steps were commenced by the Coal company a week ago to obtain possession of some of the company's houses occupied by men on strike, as these houses were needed to accommodate the new-comers who are replacing the strikers. The Glace Bay "Standard," a paper whose policy is dictated by the Mayor of Glace Bay, has taken the extraordinary attitude of advising the strikers that the company's notices quit are not worth the paper they are written on, and has further advised the striking tenants to use all necessary force to resist the officers of the law. This inflammatory advice is including many of the strikers into the belief that the company will not find it possible to evict them from their houses. These men will have a rude awakening, and if there is violence the "Standard" will be largely to blame. The connection between Mayor Douglas and the "Standard" is well known in Glace Bay, and it is not regarded as becoming or proper that the Chief magistrate of the town should be so closely identified with a newspaper which is the avowed organ of the U. M. W. A., whose columns are packed with contemptuous statements with reference to every constituted authority in the land, not excepting the courts, which in the present state of public excitement in Glace Bay, are of an incendiary nature.

Nothing definite has been given out by the U. M. W. A. executive with reference to the Springhill and Sydney Mines situation. To be consistent, a strike should be called at both places. At Sydney Mines the situation is exactly parallel with that which existed before the strike at the mines of the Dominion Coal Company. The U. M. W. A. has been non-suited by the award of a Conciliation Board, which recommended that the union be not recognized. This was regarded as a sufficient cause for a strike at Glace Bay. At Springhill, we understand, conditions are somewhat different. A Conciliation Board there has advised against a strike in the strongest terms possible, and the management of that mine have decided rather to close up and accede to the demands of the U. M. W. A., which as we showed in previous correspondence, were of the most fantastic and extravagant nature. Mr. McCullough, the Vice-President of the U. M. W. A., visited Springhill about the beginning of the first week in August, and he is reported to have threatened a sympathetic strike of the U. M. W. A. at the mines of the Cumberland Coal & Railway Company, and at those of the Nova Scotia Steel & Coal Co., should these companies dare to assist the Dominion Coal Company by supplying their orders. Mr. McCullough has not as yet called a sympathetic strike of the miners in the United States who have recently supplied 20,000 tons of American coal to the Sydney Steel Works. It is not in his power to do this. Yet this gentleman, who is impotent in his own country is allowed to go about Nova Scotia breathing threats against industries which are the very life-blood of our province. This same gentleman, whose business in our country is the destruction of its coal trade, is allowed not only to run his pernicious campaign with impunity, but is able to call upon the civil authorities of this town to afford him protection and to further his nefarious plans. We are a long-suffering people.

Another peculiar feature about this U. M. W. A. strike is the prominence given by the provincial newspapers to the utterances of the leaders, and the mendacious, incendiary, injurious reports with which these papers allow their correspondents to fill their columns. The following sample is from the "Halifax Herald" of the 4th of August, a paper which has several times passed as an accurate and unbiased journal:

"The output of coal is falling back, and it is said that conditions in the mines ARE APPROACHING CHAOS. Men are trying out coal in any sort of fashion, and gear is SUFFERING RIGHTFULLY AT THE HANDS OF INEXPERIENCED OPERATORS."

The capitals are a feature of "Herald" journalism with which all its readers are very familiar. The "Herald" lamely adds a saving clause: "This is report only." Reputable news-

papers do not publish "reports." They are supposed to be papers that disseminate news. Imagine, however, the impression which such a paragraph as that we have just quoted, will create in the mind of an untechnical and impressionable public, to whom at any time a coal mine presents itself as a dreadful and noisome hole which covers all kinds of fearful sights. The unfortunate part of yellow journalism is that the circulation of the paper must be considered before truth and decency, or even before the interests of the province.

Newspaper correspondents have not been content with despatching untrue reports, but one of them at least has taken a prominent part in the agitation, has addressed meetings of the strikers and assisted the leaders of the strike in every possible way. After identifying himself in all things with the U. M. W. A. this gentleman presented himself at the company's office and requested as the special correspondent of the "Toronto Star" that the company would favour him with an exclusive interview on the prospects of the strike from the company's standpoint, and further that he might be allowed to conduct "an impartial investigation behind the colliery barricades." This particular journalist should succeed in his profession. He is better acquainted with journalism than he is with mining, or shall we say, fisheries—but that is another story.

### QUEBEC.

**Sherbrooke.**—Messrs. A. C. Ludlum, president of the New York Engineering Co., one of the foremost builders of gold dredges and placer drillers in America, J. F. McKenzie of Montreal, Wm. Marshall of Toronto, Dr. A. N. Worthington, M.P., G. R. E. Kennedy and Kenneth E. Kennedy spent some time last week on the property of the Compton Gold Dredging Co., at Moose River.

Mr. Ludlum was unable to find any fault with it as a dredging proposition, and expressed chagrin that while looking all over the continent for dredging ground, he should have overlooked such as this, right at hand, and surprise at the apathy and blindness of local capital. Negotiations are now in progress between his company and the Compton Gold Dredging people, and if these and the checking up are satisfactory, Mr. Ludlum says he can put on a dredge by November or December. Otherwise, it will be postponed until spring. Mr. Ludlum also went to Golconda, and will submit a plan for a small dredge to the Golconda Gold Mining Co., that may solve the difficulty there, as there is no question about the gold in the gulch.

By the way, it is amusing to note the look of superior wisdom on the average Sherbrooke man's face when, in reply to his own queries, you tell him there is gold in paying quantities in the Townships, if only modern methods are utilized. He knows a long sight better, or he knows more about it than you do, or he thinks you're batty, or that you're trying to do him—think of it—him! Why, your little companies are not dominated by Messrs. the Local Magnates, nor even advised by their oracles! Go to!

One fellow who watched the party panning on Moe's River exclaimed: "Gosh dum it, is that gold? Why, dad, he useter find that yaller stuff 'n we thought 'twas brass, 'cause there wa'n't no gold 'cept in Californy 'n th' banks."

On Friday the party, accompanied by Mr. F. S. McKay and Dr. A. W. G. Wilson, of the Mines Department, Ottawa, went to Ditton to look at the gold placers there, in autos driven by Messrs. J. McCrear and W. S. Downs. Only two pans of gravel were washed, but the estimated value of the gold contents was high, running several dollars to the cubic yard. The short time available did not allow of any extended examination and the best ground on the broader flats could not be gone over. On the return to catch the New York train, the machines hit only the high places, and no remarks were heard from either the U.S. or Old Country contingent about the slowness of Canadian methods.



The chief known deposits of chromite in Quebec are at Coleraine and Black Lake and the production is steadily increasing. The annual output will soon reach 20,000 tons.

The Montreal Chrome and Iron Co., and the American Chrome Co. are two of the principal operators.

Iron ore is now treated chiefly at Drummondville and at Radnor Forges. As there are extensive known deposits in Wolfe, Sherbrooke, Brome and other counties, the erection of a customs smelter near Sherbrooke is much desired.

Three large granite quarries are now in operation in Stanstead, employing 150 hands.

The Dominion Lime Co. produces a considerable quantity of lime at Lime Ridge, in Wolfe County, at the northern terminus of the Maine Central Railway.

The slate quarries at Rockland, in Richmond County, are being worked extensively and profitably.

Dr. A. W. G. Wilson, of the Mines Department, Ottawa, spent Monday at Golconda, and was favorably impressed with the showing on the placer.

He left town Wednesday morning, in company with Mr. John McCaw, to visit the latter's property at Brompton Lake, and also the old nickel mine belonging to Col. Eustis.

Mr. Wm. Marshall, who came from Montreal some ten days ago, to inspect the property of the Compton Gold Dredging Co., at Moe's River, and went from here to Nova Scotia, was obliged to return last week to Montreal in connection with his case against R. G. Leckie, which has been dismissed, and a civil suit is pending.

Mr. Marshall has become interested in the Compton Gold Dredging Co.

## ONTARIO.

**Cobalt.**—On Friday, July 16th, a discovery of importance was made on the property known as the Cobalt Reserve, which was one of the lots of the Gillies Timber Limit, purchased in the recent sale by Mr. J. H. Waldman, of Montreal. The property was formerly known as Lot No. 22, and is located only one lot distant from the Silver Bar mine. The find was made in the northeast corner of the property and has now been traced for a considerable distance. The vein varies in width up to eight inches, and contains very high silver values, and in many respects it is very similar to the famous surface showings of the Lawson and the Temiskaming & Hudson Bay. Further work on the vein shows that it continues into the adjoining property, owned by O'Brien and Young. This new find has given a great impetus to the work being done on the Limit, and as a consequence the number of men engaged in prospecting has been greatly increased. Another find that is also claiming a great deal of attention is that made recently at the Provincial mine. Up to date the property, which is worked by the government, has made an exceedingly poor showing, and diamond drilling was resorted to in an effort to locate veins. When the hole was down about 120 feet below the surface, high grade ore was encountered. The mineralized area is about three feet wide and in the centre there is a six inch vein carrying high values in native silver.

There is a good deal of active development work going on in the Montreal River Mining Division this summer, and from time to time valuable discoveries are reported. On the diabase ridge that runs from the centre of Smythe Township, several properties have changed hands at a good figure. The most recent sale of importance was the Cleaves claims, which have been purchased by Boston capitalists. The following table, giving the approximate number of boiler and compressor plants, will help to give an idea of the work being done.

### ELK LAKE DISTRICT.

|                              | Boilers. | free air<br>H.P. per minut | Compresso-<br>Capacity<br>Cubic feet |
|------------------------------|----------|----------------------------|--------------------------------------|
| Ribble Property .....        | 95       | 410                        |                                      |
| Diabase Mining Company ..... | 30       |                            |                                      |
| Gavin Hamilton .....         | 80       | 410                        |                                      |
| Big Six .....                | 100      | 410                        |                                      |
| Cummings .....               | 100      | 330                        |                                      |
| Elk Lake Discovery .....     | 110      | 585                        |                                      |
| Moose Horn .....             | 120      | 330                        |                                      |
| Elk Lake Cobalt .....        | 100      | 585                        |                                      |
| Toledo Silver .....          | 60       | 330                        |                                      |

### SILVER LAKE DISTRICT.

|                      |     |     |
|----------------------|-----|-----|
| Otisse .....         | 160 | 825 |
| North American ..... | 30  |     |
| Silver Lake .....    | 20  |     |
| Otisse Currie .....  | 90  | 825 |

### MILLER LAKE DISTRICT.

|                 |     |     |
|-----------------|-----|-----|
| Big Six .....   | 80  | 823 |
| Blackburn ..... | 120 | 660 |
| Bonsall .....   | 100 | 330 |

### GOWGANDA.

|                   |     |      |
|-------------------|-----|------|
| Bartlett .....    | 160 | 1160 |
| Boyd Gordon ..... | 100 | 585  |

It is interesting to note that in the Blackburn mine, which is supposed to be about the best in the district, the values are found in the Conglomerate

The Jumbo mine, near Latchford, is installing a 60 horse power boiler and a three drill compressor

The Crown Reserve is putting in several more machine drills.

The Trethewey is starting to put in a concentrator, and the ground is being graded preparatory to building. It is reported that the balance of the treasury stock, amounting to about 45,000 shares, will be issued to the stockholders at par, to defray the cost of erection.

Mr. J. Reynolds, of Goldfield, Nevada, is sorting the Right of Way dump on a royalty basis. It is understood that the mine is to get fifty per cent. of the gross value.

A new vein of high grade ore has been found on the Man property in Gowganda. The vein is only about an inch and half in width, but carries large quantities of native silver.

The shaft of the Painkiller Lake Gold Mining Co., in Munro Township, is down 25 feet and the vein is of good width in the bottom of the working. It is expected that this company will put in a stamp mill next winter.

Some good ore is being taken out of the Rochester from the 65-foot level. The lower workings of the mine are not proving satisfactory so far, so the drills were put on the upper level and some good ore was encountered.

The Beaver is putting on more drills since they started their plant running, and they now have three in operation. Their vein periodically pinches out and then widens again, and when it widens, good ore is usually found.

The Station Grounds Mining Company now has three diamond drills at work prospecting their veins at depth, and the future development will be governed largely by the results obtained. Negotiations are under way to obtain one of the shafts of the Nipissing located north of the T. & N. O. Station. The headworks were destroyed by the recent fire, and if the shaft can be obtained, these will be rebuilt.

At the 200-foot level of the Shamrock mine, a two-inch vein of cobalt was discovered.



Mr. S. D. Maddin has disposed of two lots on the Gillies Timber Limit, known as A12 and A13, purchased in the recent sale, to Messrs. A. Waldman and C. Pierce, of Montreal.

The vein found in the crosscut at the 195-foot level of the Cobalt Lake mine, has widened from three to four inches, and consists of calcite carrying high values in silver.

At the Kerr Lake Majestic, which was recently acquired by the Kerr Lake, a shaft is being started near the shore on the west side of the lake. The shaft will be sunk down through the diabase.

A surface find of some importance has been made at the Foster mine. This property is controlled by the Nevins interest of the Cobalt Central.

Two crosscuts have been started from the 110-foot level of the No. 1 shaft of the Nova Scotia to develop some of the veins recently found on the surface. The shaft started a short time ago on the Bilsky vein is down over 25 feet and the vein in the bottom is about six inches wide.

Good progress is being made on the construction of the Temiskaming mill and the crushing end will soon be completed. This is distant about 300 feet from the main part of the mill, and the ore will be carried between the two places by an aerial tram.

A discovery that means a good deal to the camp was made a short time ago at the Buffalo. The drift on the No. 3 vein at the 200-foot level was run past the contact between the conglomerate and the Keewatin into the latter formation. When in about 75 feet, the Keewatin gave place to Huronian slates and the values came back into the vein. The ore consists of cobalt carrying high values in silver, and the vein is from two to five inches in width.

The failure of the directors of the Coniagas to declare the regular dividend came as a surprise to everyone. A statement has been issued giving as the reason that the money is needed for the improvements to the mill and smelter, and for the purpose of buying custom ores. It is felt generally that this is not the real reason. Last November there was a balance of over \$300,000 in the treasury, and since that time the ore production has been greater than ever before. The mill is in good condition and it is probable that there is not another mine in the camp that has such large ore reserves as the Coniagas.

Some good ore was recently encountered at the 200-foot level of the Green-Meehan, and the condition of the mine seems to be much improved.

A general meeting of the shareholders of the John Black Mining Company and the Black Mines, Limited, was held in Montreal, for the purpose of considering a scheme to amalgamate the two companies. The scheme was adopted by the shareholders, and the new company will be known as the Black Mines Consolidated, Limited. The capital is \$3,000,000, with half a million shares in the treasury. The new company will take up the stock of the old companies on a share for share basis, together with all their property, assets, etc. Besides the two properties in Coleman Township, they hold one claim on the Montcalm River and seven claims in the Gowganda and Miller Lake districts.

The Keeley mine in South Lorraine has encountered a very rich ore shoot at the 125-foot level. The Wettlaufer mine, in the same district, has also run into good ore at the 60-foot level.

Four hundred feet south of the Bilsky vein of the Nova Scotia mine, a new vein was discovered on July 26th. The ore consists of cobalt with small silver values.

Three drills are now working on the Beaver developing the veins and sinking a winze. The winze was started on the main vein and will be continued for 100 feet. This will be the deepest working of the mine and will have a total depth.

In the drift on the main vein of the Peterson Lake lease of the Little Nipissing, the vein widened from a mere stringer to

between four and eight inches of smaltite and niccolite. The drift is on the 160-foot level and is about 400 feet under the lake.

The concentrating end of the O'Brien mill will soon be in a position to start running. There are only 10 stamps to this end, the remaining 30 being used for the cyaniding. The cyanide plant will not be in operation for some time yet, as there are several parts yet to be finished. When the mill is completed it will be the largest in the camp, and will have a capacity of between 125 and 150 tons per day. This property has a small electric line operating between the mill and the different shafts for the purpose of transporting the ore, and the branch to the No. 1 shaft is already completed. The other branches are already graded and are ready to have the rails laid.

In sinking the shaft of the Ophir Cobalt, a blind vein was cut at the 75-foot level. The vein carries good values in native silver.

An important discovery has been made on the Nipissing property near Shaft No. 54. The vein is about ten inches wide, and through the centre there are six inches of cobalt ore carrying very high values in silver. The vein has now been stripped for a distance of 200 feet.

The mill at the McKinley-Darragh is unable to handle the present tonnage and it is proposed to increase the capacity by the addition of ten stamps and the necessary equipment.

The shaft of the Cobalt Central is to be sunk an additional 50 feet. No. 4 vein, which for some time has been carrying small values, has widened out and now carries high grade ore varying in width up to eight inches.

The Silver Cliff is considering the erection of a concentrator. The main workings of the mine are carried on from two tunnels. No. 1 tunnel is now in 370 feet and has to be driven 100 feet more before they cut No. 3 vein, which will be started about September.

**Gowganda.**—Prospecting has been considerably hampered for the past month or so by the flies. People are, however, flocking in again, now that the fine weather is commencing. Shining Tree and Duncan Lake districts are the centre of the rush at present.

A new strike of ore running 5,000 ounces to the ton has been made on the Gowganda Four.

A syndicate of Montreal men, known as the Everett Silver Cobalt Syndicate, have been doing prospecting work on a group of twenty-five claims in the vicinity of Everett and Miller Lakes, which they have under option until September. Three camps have been established, and a force of 100 men are at work.

The preliminary surveys for a branch line of the Temiskaming & Northern Ontario Railway, from Charlton to Gowganda, have now been completed.

Work on the wagon road from Elk Lake to Gowganda has not been making much headway and it is doubtful if the road will be completed before late in the fall.

#### BRITISH COLUMBIA.

**Rossland.**—It is not anticipated that there will be any great delay in the resumption of work at the Le Roi mine, now that Managing Director McMillan is again on the ground, having returned from a successful business trip to London. While it is not expected that heavy shipments will be made for some time to come, yet it is welcome news to men interested to hear that the plan of development is about to be put into operation. Men who are acquainted with the conditions of mining here are quite sanguine as to the outcome of the development of the lower levels of the Le Roi, and believe that large quantities of the rich ore of like character to that recently found on the 1,650-ft. level will be located.

In the Centre Star group of the Consolidated Mining & Smelting Co. of Canada good ore is being opened up in all parts



of the property. New lodes have been located on the 500-ft. level of the Centre Star; while the same level in the War Eagle is producing a heavy tonnage of \$16 to \$22 ore, most of this coming from the main vein. A big body of \$14 ore has been opened up on the eighth level of the War Eagle and the two most important Centre Star veins have been located in the depths of the Iron Mask and Idaho claims, and are yielding part of the output of the mine. At a rough calculation, the gross profits of the Centre Group during June were over \$100,000, and the net profit would be approximately one-third of this figure or over. This is figuring on a liberal charge for smelting, etc., the profit on which this concern also derives from the benefit of its own smelter. In reality the net profit on both mining and smelting operations of the Consolidated in this district are a great deal higher than appears when the operations at the mine alone are figured.

At the Trail smelter another new copper furnace has been put in operation, this being found necessary owing to the growing shipments from the company's own mines, as well as increased quantities of custom ore received. This now gives the Trail plant four copper furnaces and a large lead stack—a total capacity of over 2,000 tons per day. The lead furnace, which has just been fitted with mechanical feed, is capable of treating 250 tons of lead ore per day, producing about 130 tons of bullion. The capacity of the lead refinery is now 100 tons per day. It is the intention of the management of the smelter, however, to continue enlarging and improving the plant as the future points to a heavy treatment of company and custom ore.

A car of picked ore was shipped to Trail from the Hattie Brown mine during the past week. Development work, which is progressing steadily on this property, is making good headway and the results are all that could be expected at this stage of the work.

The shareholders of the Le Roi 2, Ltd., have received a second dividend this year of two shillings per share, while it is thought that further dividends of four shillings per share in all will be paid from the earnings of the mine during this year. Some people would wonder how the Le Roi 2, Ltd. could pay dividends of eight shillings per share when so many other mines hereabouts seem to find it almost impossible to work at a profit. While the monthly tonnage is only about 2,200-2,400 tons, still the average ore shipped goes \$22; the mine is operated on an economical scale, and while the plant is ample for all present work, there is no ponderous machinery lying about idle from which depreciation, etc., must be written off. The magic word, "mine economy," seems to be the open sesame to the Le Roi Two dividend vault. It is almost safe to say, furthermore, that there is little doubt but several other Rossland mines could be paying dividends had they not drifted into debt, etc., in the reckless days of the boom in this district.

**Boundary.**—The outlook for mining in this district during the balance of the year is most propitious. The B. C. Copper Co. now has a small force of men at work getting the mines and smelter in shape for the resumption of work next week. The coke supply is about all that is required to start work with and the trouble between the company and the Greenwood Miners' Union has been adjusted, the union having accepted the scale of wages offered by the Copper Company, and the latter corporation giving the union the same recognition as is accorded it by other operating companies in the Boundary. The B. C. Copper Co. is planning the enlargement of its smelting plant, the first step in this direction being the lengthening of the 20 ft. x 56 in. furnace, 10 feet. The two other copper furnaces in this smelter are 46 in. x 20 ft. Now that the Lewisohn interests have become so markedly identified with B. C. Copper affairs, it is likely that some sort of a working arrangement will be made between the New Dominion Copper Co. and the B. C. Copper Co., whereby the mines will be worked under one management and the smelting operations centralized at Greenwood.

Whether this will take the form of a merger or not has not been decided as yet. The arrangement would be a profitable one for both concerns. Even though the B. C. Copper Co. does not ultimately treat the ore from the New Dominion mines, the smelter will be handling a heavier tonnage than heretofore, as railway facilities will soon be built to the company's Wellington and Central camp mines, tapping the Lone Star mine in Washington as well.

The Granby Co. is preparing for heavy shipments from the Monarch claim of its group which lies south of the Gold Drop. An immense body of ore has been developed in the Monarch by diamond drill, etc., and workings are now being driven on this ore from the Gold Drop, the work being done in such a manner that every advantage will be taken of a gravity haul of nearly 3,000 feet to the huge crusher above the railway tracks. The shipments of ore from this district for the week ending July 10th amounted to 17,837 tons, which it is expected will be about as low as they will get again this year, the shipments for the following week showing a gain of over 2,000 tons, and there now being six of the enlarged furnaces in operation at the Granby smelter and the last two expected to be finished in October, the output will gradually climb until the high record of 34,957 tons for the week ending Feb. 13th will be exceeded. The week ending May 22nd holds the low record for the year with 15,680 tons.

A carload of thirty tons of ore was sent to the Grand Forks smelter from the Little Bertha mine during the past week. No shipments were made by the Golden Eagle since the 60-ton shipment in the early part of the month, and the force has been cut down, temporarily, it is stated.

Considerable surface stripping, etc., is being done on the Snowshoe mine of the Consolidated Company, with a view to increased shipments from this time on. It is likely that "glory hole" operations will be carried on at some of the surface showings.

On the Oro Denoro mine, where diamond drill exploration is being carried on, a new body of ore of considerable magnitude has been located.

A contract has been let to drive a tunnel 400 feet on the Le Roi claim, this district. Two ledges will be cut by this adit, which on the surface carry ore of good value.

**Nelson.**—The Fort Steele Mining & Smelting Co., which, it is understood, is a subsidiary company to the Federal Mining & Smelting Co., the principal bondholder in the Sullivan Group Mining Co., bought in all the mines, smelter and supplies of the last named company at sheriff's sale a few days ago. This will mean the winding up of the affairs of the Sullivan Group Mining Co. and it is likely that the shareholders will get very little to show for their white chip. The creditors of the company are to be provided for in a special stock issue which will be redeemable at par. The Federal Company held about \$225,000 bonds in the Sullivan Company. The smelter is said to be worth nearly \$400,000 and there are about 150,000 tons of ore blocked out in the mine, carrying an average of 15 per cent. lead and 6½ oz. silver.

A force of about twenty men is at work opening up the big copper property on Moresby Island, which A. B. W. Hodges, of the Granby, and associates, are interested in. From present appearances, the Moresby copper deposits will far exceed those of the Boundary, the mining conditions being all that could be asked for. The ore is rich in copper and gold, contains enough lime and iron to smelt well, and then there is the advantage of cheap water transportation to the smelter and market.



## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Glace Bay.**—What is said to be the first exhaust steam turbine engine in Canada is shortly to be erected in the Central Electric power house of the Dominion Coal Company at Glace Bay. The plant will consist of one 1,000-kw. generating unit. The turbine will be of the Rateau design, impulse type, and will utilize exhaust steam at about atmospheric pressure, or 15 lbs. absolute.

The text of the report of the board of conciliation in the pringhill mining trouble, given out on July 29, is a blow to the United Mine Workers. Judge Longley, chairman, Charles Archibald, for the company, and E. B. Paul, for the men, constituted the board. Recognition of the union, determination of the standard weight of a box of coal, a schedule of prices and a packing system, were the demands. There are about forty thousand words in the report, the general conclusion of which is favourable to the company. Recognition or non-recognition of unions is left to the company, the board finding that the employers should say how far they will recognize organizations having central authority outside of Canada and controlled by interests that may be in acute competition with those of this country. The demand for schedule rates is refused as involving an increase of forty per cent. to those working underground and twenty-eight per cent. to surface men. The losses of the company on three years are said to have been \$300,000, and under the circumstances the board thinks it unreasonable and impracticable for employees to expect increased rates. Strained relations between the management and the men have resulted in 26 strikes in 22 years, and the board thinks the directors should look into this. While Mr. Paul agrees in the main with the conclusions, he submits a memorandum to the effect that recognition of the United Mine Workers local would allay friction. He thinks also, there should be a rate schedule.

### ONTARIO.

**Ottawa.**—The increased trade development and improved financial conditions are resulting in a greater demand for the exchange of silver and copper at the Royal Mint. Just at present the institution is undergoing repairs, but an unusual amount of activity is promised when it resumes next month. Very little gold so far has been refined, but a contract has been let for a refinery building. When this is completed a bigger gold coinage is expected.

At the Finance Department it is stated that the arrangements are practically completed with the banks for the redemption at 75 per cent. of face value of plugged coins. The Receiver-General will redeem them through the medium of the banks.

**Cobalt.**—The two parallel veins on the Peterson Lake lease of the Kerry Mining Company look well, and good ore is being

taken from them. Seventy feet of drifting has been done on the one and fifty on the other. The shaft on the property is now down 200 feet.

**Sault Ste. Marie.**—A Michipicoten iron ore deposit has been purchased by the Lake Superior Corporation from a group of Michipicoten owners.

### BRITISH COLUMBIA.

**Phoenix.**—The Greenwood-Phoenix tunnel is in 200 feet and advancing three feet per day by hand labor.

**Kaslo.**—Four hundred tons of zinc ore were shipped from Kaslo during the second week of July.

**Nelson.**—The rehabilitation and restoration to the shipping list of the best known silver-lead properties on Kootenay Lake, the Highland and the Buckeye, which have now been amalgamated to be known as the Highland-Buckeye, which made its first shipment for some years past to the Consolidated Company's smelter at Trail last week, means much to the Ainsworth camp and the Kootenay district generally.

The property has only been owned by its present operators, a New York syndicate, of which J. S. Airheart is manager, since June 5th last. Already rapid progress has been made in the way of cleaning things up around the mine and in getting the mill, having a capacity of 200 tons, into readiness for operation.

The mine is situated two miles north of Ainsworth at a height of about 2,000 feet above the lake and about one mile from the shore, where is located the mill, which is connected with the mine by means of an aerial tramway.

Since the property was taken over last month from W. J. Wilson and associates it has been worked to its fullest capacity and is now in a position to make regular shipments. The shipment which will go forward this week will be crude ore, which is expected to run between 60 and 70 per cent. lead and between 25 and 30 ounces of silver.

A large force of men are employed at the mine and now that shipments have been resumed, the staff will be considerably increased.

The Highland is one of British Columbia's most famous mines, having in 1903 been the largest shipper in the province, while in the following year it was second only to the St. Eugene.

A good showing of ore has recently been located in the No. 2 tunnel, where it had been lost by the previous operators of the property, and good bodies of ore are also being worked in the No. 1 and No. 3 tunnels.

The future development of the Highland-Buckeye will be watched with a good deal of interest by Kootenay mining men generally.

## MINING NEWS OF THE WORLD.

### GREAT BRITAIN.

The Scottish coal owners decided on July 8th to post notices forthwith intimating a reduction of wages by 12½ per cent. on the 1888 basis, dating from July 26th. It is possible that a peaceful solution of the difficulty may yet be reached. In any case it is expected that no sympathetic strike will occur in the Welsh and English fields, in the event of the Scottish Miners' Federation calling out the men.

For the first six months of 1909, the returns of the Welsh coal trade show 12,909,950 tons exported, as compared with 12,272,540 tons in 1908. The figures for June are 2,037,599 tons, as against 1,876,563 tons for June, 1908. The highest price for best Cardiff coal in June, 1908 was 16s. 6d., the lowest, 16s. The corresponding figures for this year are 22s. and 16s. 6d.

The special conference of the Miners' Federation of Great Britain to receive the result of the ballot which has been taken

in the mining districts throughout England, Scotland and Wales as to whether there shall be a general stoppage in the event of the Scottish coal owners persisting in giving notices to their workmen, was held in London on July 28th.

So overwhelming has been the vote for a general stoppage in support of the Scottish miners that the preventing of a strike at practically all the coal mines of Great Britain depends now upon the success of the Board of Trade negotiations for a settlement.

Opinion on that critical point is divided, though the best opinion in the Federation is that a settlement will be effected without a stoppage. It may be stated that the Scottish delegates are not so optimistic as their English colleagues as to the prospect of an immediate settlement. In the opinion of Mr. Smillie, the President of the Scottish Miners' Federation, the outlook is very bad, but this pessimistic view of the situation is not shared by others who have taken part in the joint conferences. There is a reasonable prospect of a settlement. Mr. Askwith, K.C., who presided at the second meeting of the Board of Trade on Friday and at Glasgow on Tuesday, has proved a skilful mediator, smoothing away points of difference and suggesting points of concession and agreement.

The conference began its sitting at two o'clock, and the proceedings lasted for less than an hour and a half. Mr. W. Abraham, M.P., South Wales, presided in the absence through illness of Mr. E. Edwards, and there were present 130 delegates.

The proceedings were private, but at the adjournment Mr. A. Stanley, M.P., presented the following official report:

"The conference is called specially to receive the result of the ballot taken of the members upon the question whether or not the whole of the Federation shall put into operation the twentieth rule and declare a general stoppage in sympathy with the Scottish miners in their determination to resist a demand of the Scottish coal owners for 12½ per cent. reduction in wages. The result showed that 518,361 had voted for a general stoppage and 62,980 against, giving a clear majority for a stoppage of 455,381."

The deputation who had been appointed by the Federation to assist in the negotiations before the Board of Trade and also with the Scottish coal owners on the matter gave a report of these transactions, and the following resolutions were carried unanimously:

"That unless a satisfactory settlement be arrived at tomorrow with regard to the Scottish dispute, notices be given in all districts to terminate contracts to end on the last day of August.

"That in view of the ballot of the Federation being so strongly in favour of a general stoppage, financial support equal to 10s. per week be paid to the Scottish miners during their preliminary stoppage, and that the carrying out of this resolution be delegated to the Executive Council."

The thickest seam of coal proved in Kent was discovered on July 23rd in one of the borings between Canterbury and Dover at a depth of only 1,459 feet from the surface. The seam proved to be 5 feet 9 inches in thickness, some fine samples of clean, bright coal being brought up in the large core barrel. This is the fourth seam discovered in the same boring.

#### UNITED STATES.

On coal the duty has been decreased from 67 cents a ton to 45 cents. Last year from the Maritime Provinces and British Columbia mines there was shipped to the New England and Pacific States markets coal to the value of \$4,041,562. The reduction of the duty on coal is one of the most important features of the new tariff from the Canadian standpoint. The placing of hides on the free list is also likely to be of material benefit to Canadian exporters. Last year Canada exported to the States hides to the value of \$1,308,551.

The reduction in the duty on agricultural implements from 20 per cent. to 15 per cent. is hardly likely to have any effect on

Canada. The American market can be controlled by the American manufacturers in any event. Last year our exports of agricultural implements to the States amounted to only \$15,459.

#### MEXICO.

A gigantic steel plant will be established in Mexico City within the coming year by French and American capital. The initial outlay will be \$50,000,000.

Victor Belanger, of Paris, is the head of the concern. It is understood that a part of the capital will come from Paris and Boston. Coal and iron mines in Buffalo will be acquired later by the company. The steel will be manufactured by a new and secret process.

#### SOUTH AFRICA.

The directors of the City Deep, Ltd., have offered a handsome bonus to the Victoria Falls and Transvaal Power Company Ltd., to supply power this month, thus accelerating production by some three months ahead of what has been anticipated.

According to official returns, the value of the mineral output of the Transvaal for the half year which ended on 30th June last was £16,723,785, of which gold represented £15,472,409, and diamonds £580,807. The total decrease, as compared with the previous half year, was £114,010, of which gold accounted for £57,403 and diamonds for £133,682. Coal and other mineral showed an increase of £79,348, while silver decreased by £2,268.

#### AUSTRALIA.

The value of the mineral exports from New South Wales for the half year ended 30th June was as follows: Silver £86,199; silver-lead concentrates, £480,575; lead matte, £91,679; copper, £296,750; tin, £142,049; coal, £1,193,042.

The discovery of rich gold-bearing ore at Ballarat has been officially reported to the Government. The strike runs in northerly direction, almost under the centre of the city. The fact that most of the operations have hitherto been carried on in southerly direction enhances the importance of the discovery.

## Company Notes.

The Coniagas, which passed its last dividend, as a matter of policy rather than necessity, has paid the following dividends since its inception:—

| Date.                 | P.C. | Bonus. |            |
|-----------------------|------|--------|------------|
| 1907—May 1 .....      | 2    |        | \$80,00    |
| June 1 .....          |      | 1      | 40,00      |
| July 1 .....          | 2    |        | 80,00      |
| September 1 .....     | 2    |        | 80,00      |
| November 1 .....      | 2    |        | 80,00      |
| 1908—January 1 .....  | 2    |        | 80,00      |
| March 1 .....         | 2    |        | 80,00      |
| May 1 .....           | 2    |        | 80,00      |
| July 1 .....          | 2    |        | 80,00      |
| November 1 .....      | 3    |        | 120,00     |
| 1909—February 1 ..... | 3    |        | 120,00     |
| May 1 .....           | 3    |        | 120,00     |
| Total .....           | 25   | 1      | \$1,040,00 |

The Kerr Lake dividend for the third quarter of 1909 announced at 30c per share, brings the total disbursements that mine up to a total of \$1,320,000, or 38 per cent. on a total capitalization authorized and issued of \$3,000,000. The value of the shares is \$5.



# STATISTICS AND RETURNS.

The Dominion Coal Co.'s shipments for July totalled 203,982 tons.

The output of coal from the mines of the Nova Scotia Steel & Coal Company for the month of July totals 74,613 tons, and in addition 24,300 tons lifted from the coal bank. This output is considered very good, especially as the days worked for the month numbered only twenty-five, making the average 3,000 tons daily.

Shipments from the collieries of the Cumberland Railway & Coal Co. for the month of July were 29,295 tons.

Shipments of ore from Cobalt camp for the month of July totalled 2,715 tons, as against 3,323.74 tons in the preceding month. There were 21 shippers, and they sent out 106 cars. In the seven months the camp has shipped 18,006.20 tons, which compares with 25,361.10 tons in the whole of 1908. The monthly totals are:—

|                | Tons.           |
|----------------|-----------------|
| January .....  | 2,374.03        |
| February ..... | 2,113.94        |
| March .....    | 2,447.90        |
| April .....    | 2,482.83        |
| May .....      | 2,508.71        |
| June .....     | 3,323.74        |
| July .....     | 2,715.05        |
|                | <hr/> 18,006.20 |

Consolidated Mining & Smelting Co. of Canada, Ltd., reports more receipts at the Trail smelter, in tons, for the week ending July 31st, and year to date, as follows:—

|                            |             |               |
|----------------------------|-------------|---------------|
| Centre Star .....          | 3,349       | 99,091        |
| St. Eugene (Concen.) ..... | 453         | 13,971        |
| Snowshoe .....             | 4,083       | 70,706        |
| Other mines .....          | 1,599       | 25,411        |
| Total .....                | <hr/> 9,484 | <hr/> 209,179 |

## COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending July 21, and those from Jan. 1, 1909, to date:—

|                        | July 31.    | Since Jan. 1. |
|------------------------|-------------|---------------|
|                        | Ore in lbs. | Ore in lbs.   |
| Chambers-Ferland ..... | 60,430      | 900,070       |
| Cobalt Central .....   | 40,180      | 477,804       |
| Coniagas .....         | 62,520      | 051,525       |
| Crown Reserve .....    | 63,000      | 3,506,379     |
| Kerr Lake .....        | 60,700      | 1,298,146     |
| La Rose .....          | 260,000     | 7,458,023     |
| McKinley-Daragh .....  | 57,300      | 1,115,206     |
| Nipissing .....        | 187,280     | 7,936,393     |
| O'Brien .....          | 64,030      | 1,482,542     |
| Right of Way .....     | 123,330     | 2,032,691     |
| Silver Cliff .....     | 60,820      | 60,820        |

The shipments to July 31, 1909, from Jan. 1, are 34,837,962 pounds, or 17,418 tons.

Total shipments for week ending July 31 are 1,039,590 pounds, or 519 tons.

## COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending Aug. 7, and those from Jan. 1, 1909, to date:—

|                               | Aug. 7      | Since Jan. 1. |
|-------------------------------|-------------|---------------|
|                               | Ore in lbs. | Ore in lbs.   |
| Buffalo .....                 | 42,250      | 748,678       |
| Chambers-Ferland .....        | 60,940      | 961,010       |
| City of Cobalt .....          | .....       | 938,522       |
| Cobalt Central .....          | .....       | 477,804       |
| Cobalt Lake .....             | .....       | 79,960        |
| Coniagas .....                | 91,799      | 1,043,315     |
| Crown Reserve .....           | 181,700     | 3,688,079     |
| Drummond .....                | .....       | 920,000       |
| Kerr Lake .....               | .....       | 1,298,146     |
| King Edward .....             | .....       | 183,740       |
| La Rose .....                 | 258,400     | 7,716,423     |
| McKinley-Darragh .....        | .....       | 1,115,206     |
| Nipissing .....               | 128,690     | 8,065,083     |
| Nova Scotia .....             | .....       | 480,810       |
| Nancy Helen .....             | .....       | 83,400        |
| Peterson Lake .....           | .....       | 241,110       |
| O'Brien .....                 | 83,200      | 1,565,742     |
| Right of Way .....            | .....       | 2,032,691     |
| Silver Queen .....            | 175,710     | 431,045       |
| Silver Cliff .....            | 63,000      | 123,820       |
| Temiskaming .....             | .....       | 1,446,820     |
| Trethewey .....               | 128,860     | 1,296,698     |
| Temiskaming & Hudson Bay .... | 64,000      | 1,106,260     |
| Muggley Consolidated .....    | .....       | 72,900        |

Ore shipments to Aug. 7, 1909, from Jan. 1, are 36,116,502 pounds, or 18,058 tons.

Total shipments for week ending Aug. 7, 1909, are 1,278,500 pounds, or 639 tons.

## BRITISH COLUMBIA ORE SHIPMENTS.

For week ending July 31st:—

| Boundary—                   | Week.        | Year.         |
|-----------------------------|--------------|---------------|
| Granby .....                | 18,763       | 570,407       |
| Snowshoe .....              | 4,083        | 71,706        |
| Golden Eagle .....          | 60           | 390           |
| Other mines .....           | .....        | 140,654       |
| Total .....                 | <hr/> 22,906 | <hr/> 783,157 |
| Rossland—                   |              |               |
| Centre Star .....           | 3,349        | 99,091        |
| Le Roi No. 2 .....          | 628          | 17,732        |
| Le Roi No. 2 (milled) ..... | 260          | 7,640         |
| I. X. L. .....              | 59           | 74            |
| Other mines .....           | .....        | 9,487         |
| Total .....                 | <hr/> 4,296  | <hr/> 134,024 |

### Slocan-Kootenay—

|                                |     |        |
|--------------------------------|-----|--------|
| Queen (milled) .....           | 420 | 12,390 |
| Granite-Poorman (milled) ..... | 250 | 7,350  |
| Whitewater Deep (milled) ..... | 700 | 20,000 |
| Kootenay Belle (milled) .....  | 70  | 2,070  |
| Second Relief (milled) .....   | 145 | 4,280  |
| Nugget (milled) .....          | 110 | 3,250  |
| Bluebell (milled) .....        | 900 | 26,600 |
| St. Eugene .....               | 453 | 12,871 |

|                       | Week. | Year.   |
|-----------------------|-------|---------|
| Silver King .....     | 222   | 2,228   |
| North Star .....      | 169   | 634     |
| Van Roi .....         | 102   | 369     |
| Silver Cup .....      | 45    | 846     |
| Cork .....            | 39    | 164     |
| Second Relief .....   | 34    | 175     |
| Granite-Poorman ..... | 30    | 288     |
| Yankee Girl .....     | 22    | 475     |
| Rambler-Cariboo ..... | 22    | 475     |
| Other mines .....     |       | 13,060  |
| Total .....           | 3,738 | 108,905 |

The total shipments for the past week were 30,941 tons, and for the year to date 1,026,086 tons.

#### SMELTER RECEIPTS.

|                                  |        |         |
|----------------------------------|--------|---------|
| Granby, Grand Forks .....        | 18,763 | 570,767 |
| Consolidated, Trail .....        | 9,484  | 219,680 |
| Le Roi, Northport .....          |        | 12,761  |
| B. C. Copper Co., Greenwood .... |        | 140,505 |
| Totals .....                     | 28,247 | 943,713 |

For the first six months of 1909 Granby Consolidated has produced in round figures 12,000,000 pounds of copper—a recovery of 24 pounds of copper to the ton upon 495,000 tons of ore treated.

In this six months period Granby has earned a profit of about 3 cents per pound upon this product, which would be equal to about \$2.75 per share.

Granby will place in commission two more of its enlarged furnaces. In a few weeks the entire battery will have been enlarged, and then the Granby will be able to produce 35,000,000 pounds of copper per annum at a 10-cent average cost. Such output and cost would indicate net earnings of \$8 per share on 13-cent copper and \$2.50 per share additional earnings for every 1-cent advance in copper.

#### RHODESIAN GOLD OUTPUT.

The total output of gold from Rhodesia for the month of June is cabled as 51,678 ozs., valued at £217,600, as against 53,467 ozs., valued at £225,032, in the previous month. This is a decrease on the month of £7,432. There were 229 gold producers last month. The output of other minerals for last month was: Silver, 23,049 ozs.; lead, 83 tons; coal, 16,347 tons; copper, 9 tons; chrome ore, 4,207 tons; asbestos, 20 tons.

The following table shows the monthly gold returns in sterling, for six months of 1909:—

|                |           |
|----------------|-----------|
| January .....  | £204,666  |
| February ..... | 192,497   |
| March .....    | 202,157   |
| April .....    | 222,700   |
| May .....      | 225,032   |
| June .....     | 217,600   |
| Total .....    | 1,264,652 |

#### TORONTO MARKETS.

##### Metals.

Aug. 9.—(Quotations from Canada Metal Co., Toronto.)  
Spelter, 5¼ to 5½ cents per lb. (Market strong).

Lead, 3.4 to 3.5 cents per lb.

Antimony, 8 to 9 cents per lb.

Tin, 30½ cents per lb.

Copper—

Casting, 13.5 per lb.

Electrolytic, 13.75 cents per lb.

Ingot brass, 9 to 14 cents per lb.

Pig Iron.—Aug. 9.—(Quotations from Drummond, McCa Co.)—

Summerlee, No. 1, \$22 (f.o.b. Toronto).

Summerlee, No. 2, \$21.50 (f.o.b. Toronto).

Midland, No. 1, \$19.50 (f.o.b. Toronto).

Coal—

Anthracite, \$5.50 to \$6.75.

Bituminous, \$3.50 to \$4.50 for 1¼ inch lump.

#### MARKET REPORTS.

##### Coke.

Aug. 5.—Connellsville coke, f.o.b. ovens—

Furnace coke, prompt, \$1.60 to \$1.70 per ton.

Foundry coke, prompt, \$1.85 to \$1.90 per ton.

##### Metals.

Aug. 5.—Tin, straits, 29.40 cents.

Copper, prime lake, 13.50 cents.

Electrolytic copper, 12.90 to 13 cents.

Copper wire, 15 cents.

Lead, 4.30 to 4.35 cents.

Spelter, 5.60 to 5.65 cents.

Sheet zinc, 7.75 cents.

Antimony, Cookson's, 8.25 to 8.37½ cents.

Aluminium, 21 to 24 cents.

Nickel, 40 to 47 cents.

Platinum, \$22.50 to \$23.50 per oz.

Bismuth, \$1.75 per lb.

Quicksilver, \$43 to \$44 per 75 lb. flask.

#### SILVER PRICES.

|               | New York | London. |
|---------------|----------|---------|
|               | Cents.   | Pence.  |
| July 22 ..... | 50⅞      | 23 7-16 |
| " 23 .....    | 50¾      | 23¾     |
| " 24 .....    | 50¾      | 23¾     |
| " 26 .....    | 51       | 23½     |
| " 27 .....    | 50⅞      | 23 7-16 |
| " 28 .....    | 50⅞      | 23 7-16 |
| " 29 .....    | 50¾      | 23¾     |
| " 30 .....    | 50⅞      | 23 7-16 |
| " 31 .....    | 50¾      | holiday |
| Aug. 2 .....  | 50¾      | 23 7-16 |
| " 3 .....     | 51       | 23 9-16 |
| " 4 .....     | 50⅞      | 23½     |
| " 5 .....     | 50⅞      | 23½     |

#### PERSONAL AND GENERAL.

Mr. H. Kilburn Scott has left for Bulgaria on professional business.

Mr. Algernon P. Seymour has been appointed superintendent of the Cobalt Lake Mining Company.

Mr. R. T. Hodgson, M.A., a graduate in the geological department of Queen's University, who has spent the last nine years in the West, has been renewing acquaintances in Toronto. Mr. Hodgson was well known in Eastern Ontario ten or twelve years ago in connection with his work as assistant to W. G. Miller in the corundum field in 1897-8.



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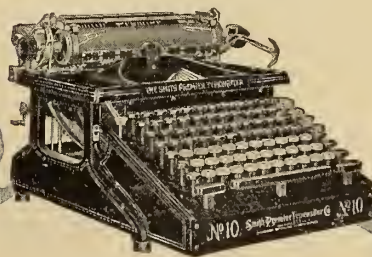
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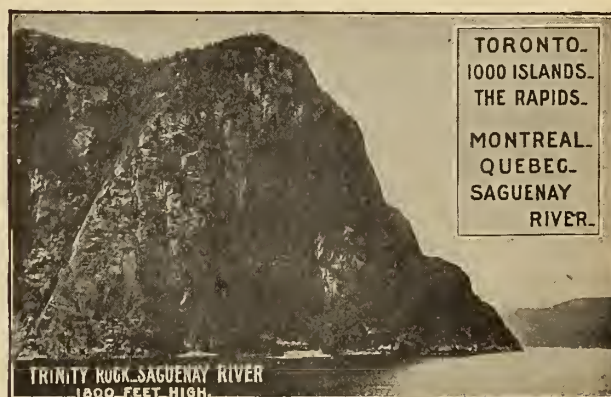
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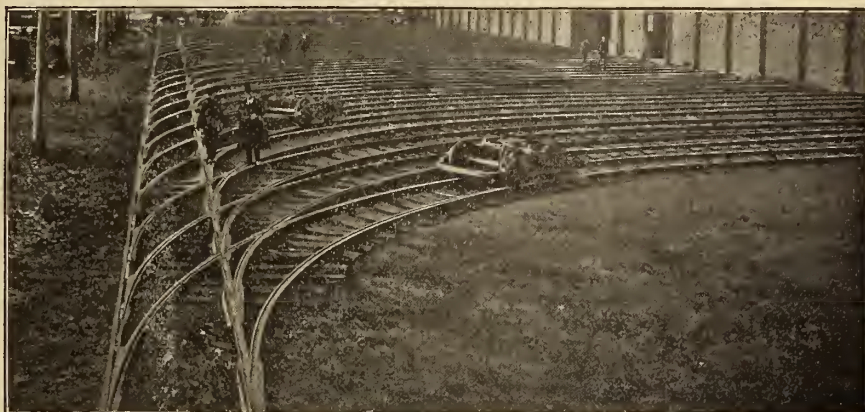
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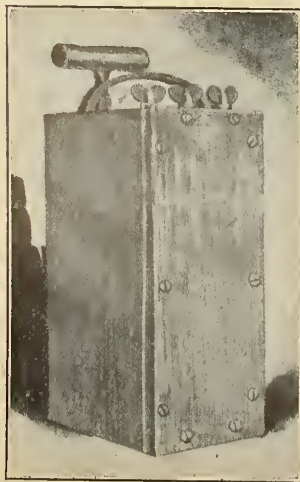
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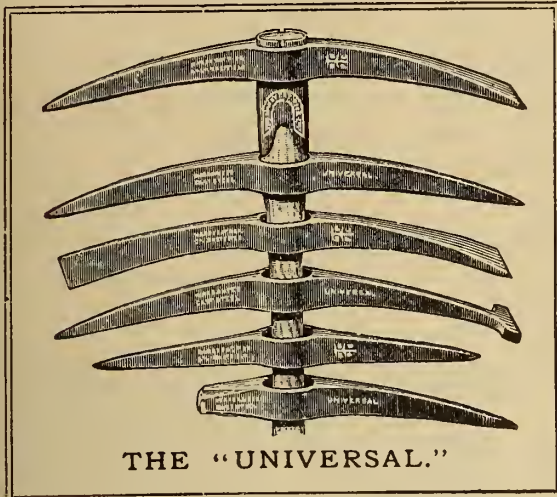
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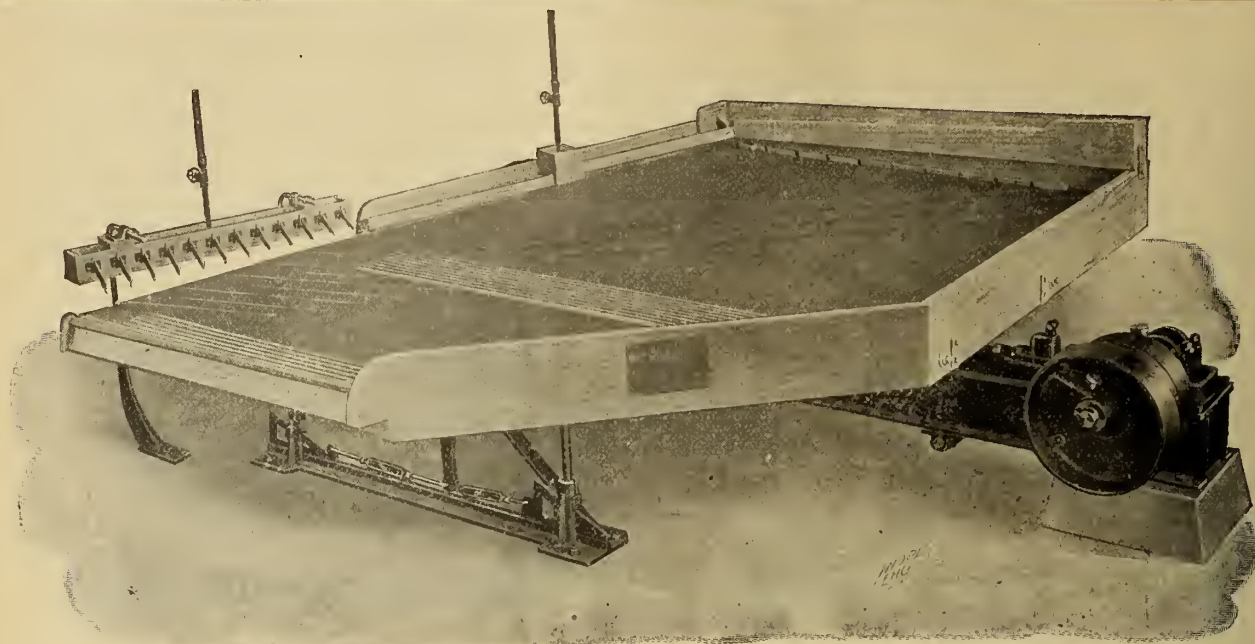
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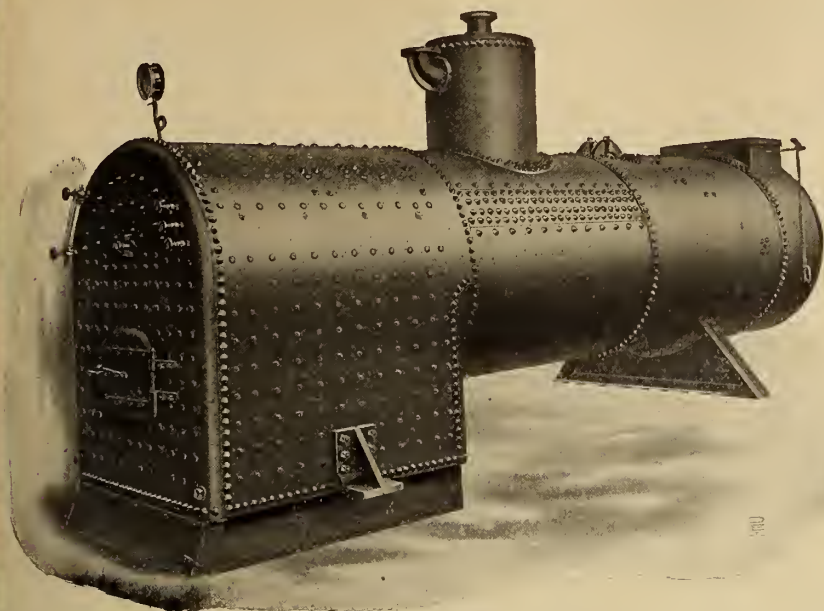
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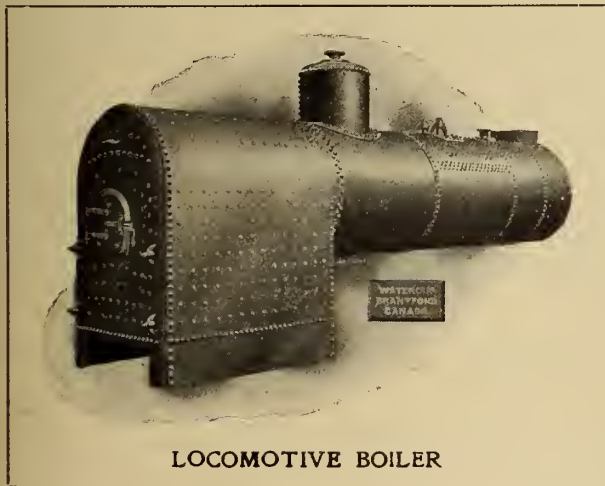
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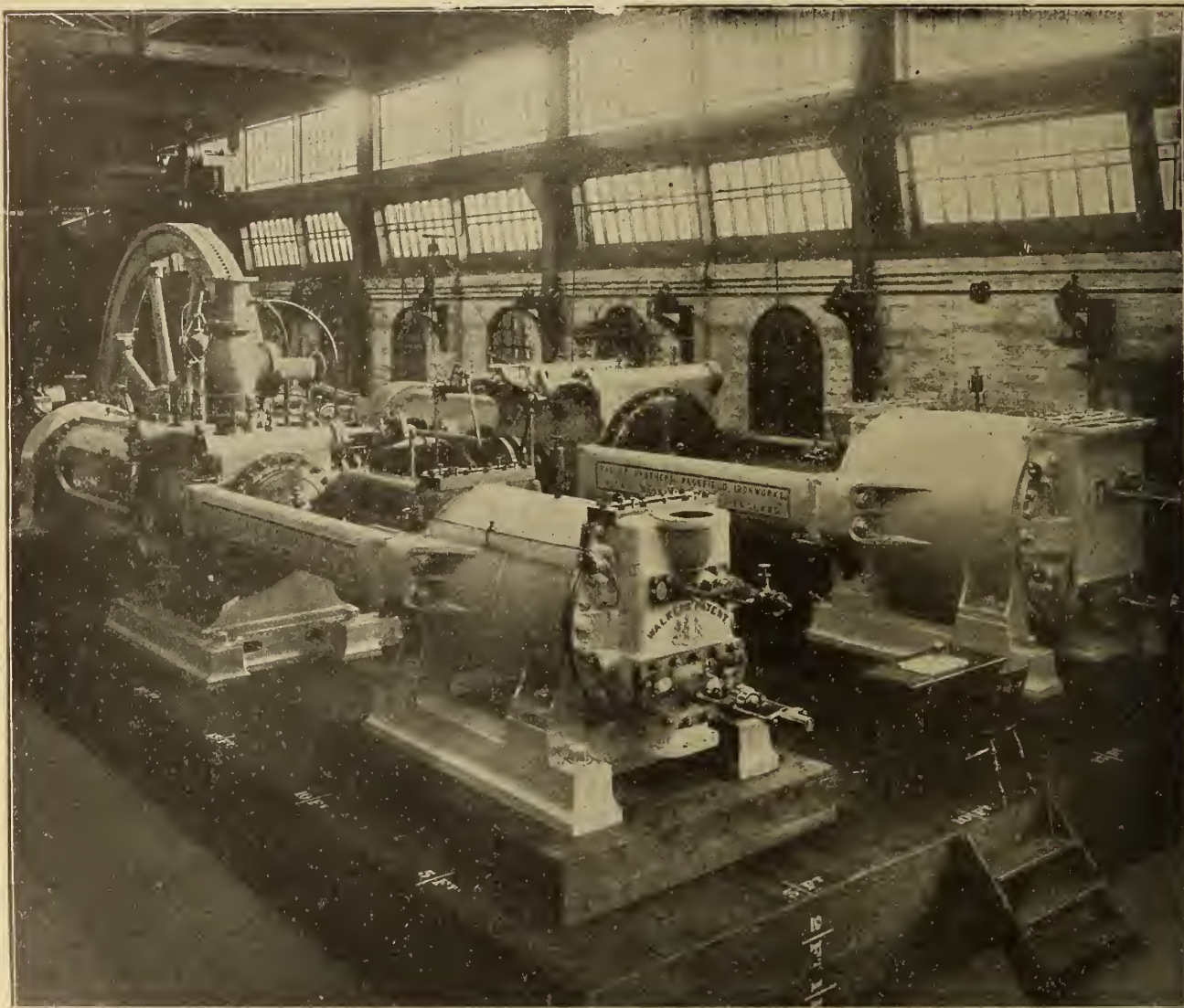
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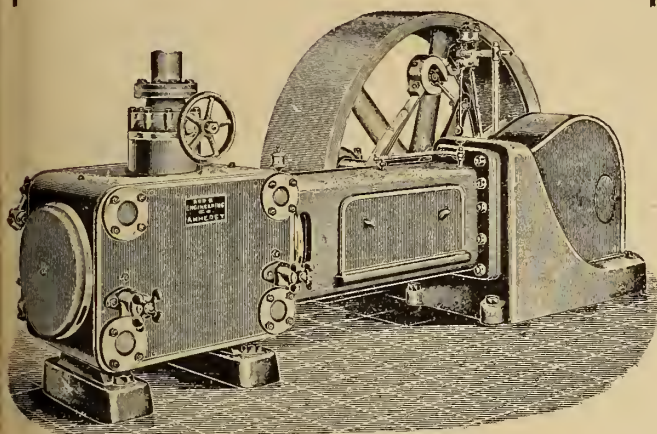
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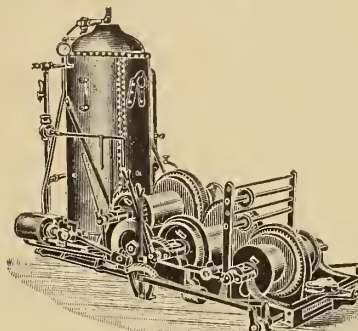
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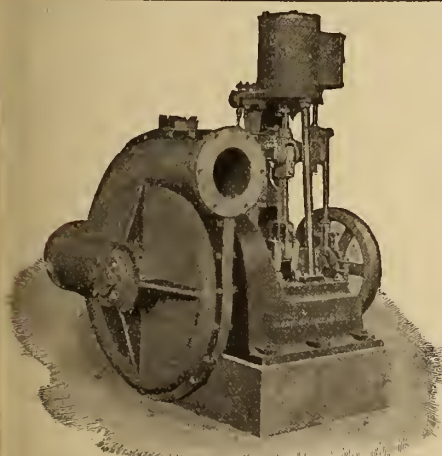
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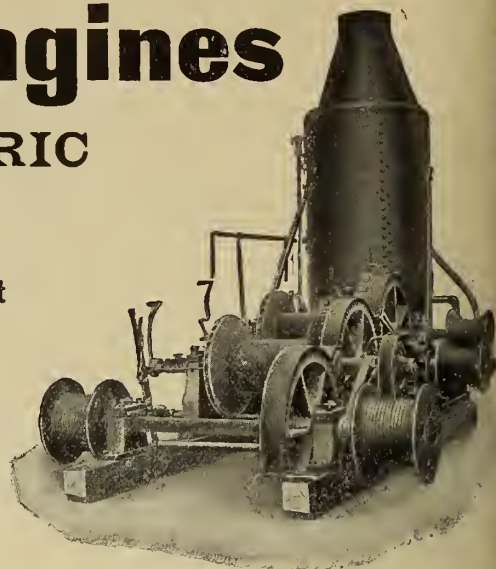
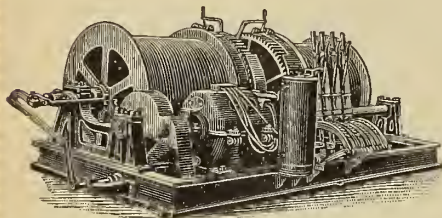
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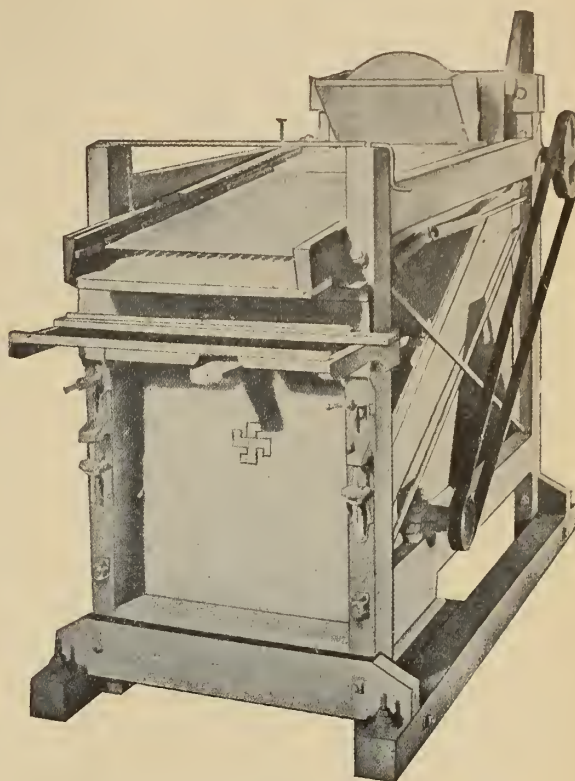
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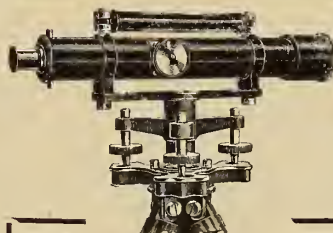
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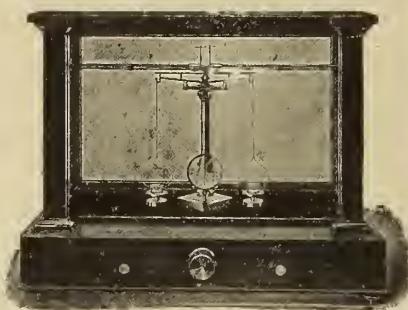
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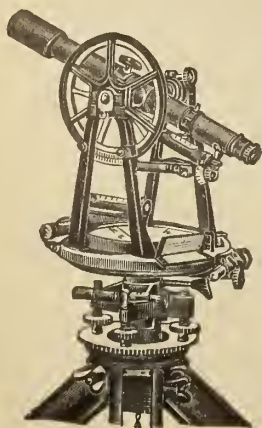
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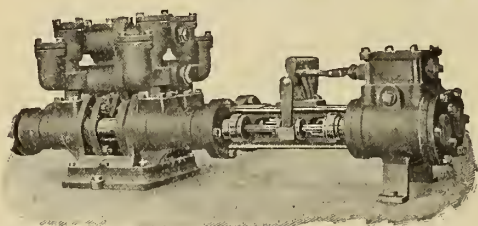
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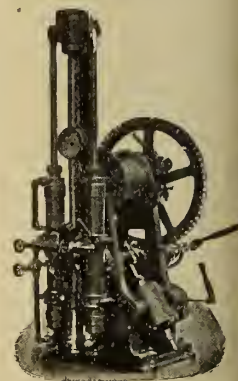
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, September 1, 1909

No. 17

## The Canadian Mining Journal

With which is incorporated the  
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### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, in average of 3,822 per issue.

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### ONTARIO'S NEW SCHOOL BOOKS.

Time was, and is yet, when the purchase of school books constituted a serious annual drain on the resources of the wage-earner. The old "readers," "spellers," "jographies" ("geography" is a modern corruption), "rithmetics," "grammars," and so on, were costly. Indeed the prices charged for them were squares or cubes of their intrinsic value. Often these stilted volumes would descend progressively through each member of the family. Hence, by the time they got into the hands of the youngest of a large brood the school books were in a shocking state of disrepair.

If our memory does not mislead us, it is within bounds to assert that the only enjoyment extracted from the "readers" of a generation ago arose from their use as missiles and from an interchange of transfer-pictures and other amenities on the fly-leaves. Our instructors probably would have developed a brain-storm had their pupils shown symptoms of deriving pleasure from their allotted stint. In short, the function of the teacher was to crowd into the child's mind as many facts and figures as possible—very much as the farmer packs hay into the mow. And, at stated intervals, under the artificial pressure of oral and written examinations, the pupil was supposed to exude these facts and figures. Ability was judged by the facility with which youthful victims could string off the names of countries, monarchs, and political divisions, or jabber the meaningless "dates" of irrelevant events in history. It is not surprising then that many luminaries in the firmament of letters, such as Sir Walter Scott and Robert Louis Stevenson (and others whom we refrain from mentioning) should have been branded as unsuccessful students. It merely meant that boys possessed of any degree of originality were instinctively averse to surrendering their intellectual independence, and were unable to find in the school-room anything to inspire either their interest or their respect.

But the old order has changed. The eyes of pedagogues have been opened. Continued study and observation of the psychology of the child, and closer attention to the laws of hygiene, have wrought marvels in our educational system; although no one can truthfully affirm that many and manifest defects do not yet exist. Morally, mentally, and physically, the conditions of school children to-day is vastly better than it ever has been. And, perhaps, the most striking outward and visible manifestation of this growth in grace is in the modern school book. This brings us to the subject on hand.

The Ontario Department of Education has recently issued a series of school "readers." These books are

durably bound, beautifully printed, and decently illustrated. In price they range from four cents for the "primer" to sixteen cents for the "fourth reader." These prices are little less than marvellous. The enterprising firm that took such a low contract may be credited with some species of legerdemain, and the Department is certainly to be felicitated upon the price and appearance of the new readers.

But as regards the matter contained in the books, there is room for much difference of opinion.

While we believe that in general the compilers are on the right track, we think that they have fallen short in one essential. On the frontispiece of each reader is a coloured reproduction of the British flag. Throughout the reading matter there is an ample sprinkling of incidents and exportation calculated to inspire sentimental loyalty. But there is a marked paucity of readings that tell of Canada as it is, of our fisheries, agriculture, mining, and manufactures.

Possibly we have an overplus of sentimental loyalty in this country. Vociferations do not build empires. Flag-waving does not develop our nationhood. What every Canadian needs, what should be one of the first prerequisites of citizenship, is an intelligent knowledge of Canada. This has not been kept in view in compiling the Ontario Readers. In fact, this is the point of our argument. We believe that those who are responsible for the "readers" have given too little attention to things Canadian, and too much to conventional literature.

The half-tones that embellish the text are good. They are distinctly Canadian. But there is nothing to correspond to them in the text. Some, at least, of the material purporting to deal with our great Northwest is fearfully inaccurate. Many sources, from which profitable material could have been obtained, have been overlooked or neglected. The compilers need to be reminded that in our progress towards nationhood the building of a railway is of infinitely greater significance than any political or military episode. And surely our children should be taught the meaning of our railways, our mines, our forests, and our farms.

Glancing through the two more advanced "readers," we can see nothing that would indicate to a child that Canada possesses minerals and mines. This is an inexcusable omission. The neglect of one industry might be excused, but when practically no mention is made of industrial phases of life, then we claim that the point-of-view is radically wrong.

Briefly, the new Ontario Readers, excellent though they be in many regards, still conform to the outworn and artificial standards of thirty years ago. While they are probably the best school books that we have yet seen, still they fall very far short of what they should and could be.

## QUARTERLY DIVIDENDS.

The first few years in the life of a metalliferous mine or of a colliery are normally apt to be non-productive of net profits. The bonanza mine may be able to render dividends in its first year. But, even when this is possible, it is seldom good business. The exigencies and risks of mining demand that positive reserves of ore and cash be developed before dividends are thought of.

It is often the case that a mining concern, flushed with early success, commits itself definitely to the policy of paying quarterly dividends. Almost always such a course necessitates the occasional or frequent passing of dividends. Cobalt has provided several disturbing instances of this.

Other things being equal, it appears to us that annual declaration of dividends is certainly preferable to quarterly distributions. Temporary setbacks frequently disturb the operation of a mine to an extent that renders extraordinary expenditure necessary, or curtails for a period the output of ore. These passing difficulties may be felt keenly for a month or longer, but may be entirely overcome during the year. Hence, when quarterly dividends would seriously inconvenience the management, yearly dividends would not affect operations. We prefaced the last paragraph with the conditional phrase. Other things are not equal. The quarterly dividend is looked upon as a spur to the mine manager. The shareholder becomes accustomed to claiming it as his right, and the mine suffers. Moreover a dividend expected every three months provides an effective instrument for the stock manipulator.

We shall be glad to receive and publish expressions of opinion from our readers. The subject is important from more than one point of view.

## ORGANIZED LABOUR.

The constantly increasing efforts of labour leaders in the direction of international confederation are pregnant with significance. It requires no flight of the imagination to discern a settled design beneath the visit of prominent American labour-socialists to Europe. It is quite as improbable that the incursion of the United Mine Workers into Canada arose from the unselfish desire of certain demagogues to aid the miners of the Dominion. Whatever the ostensible objective of the labour propaganda may be, its ultimate purpose is the widest and closest possible inter-union of labour societies.

And in this aim, per se, there is little to condemn. Individuals and societies alike, who strive to ameliorate the conditions of human life, are deserving of praise and sympathy. But it is a patent fact that the majority of labour leaders on this continent are demagogues, imbued with the dogmata of a crude form of socialism which is in reality a variant of anarchism modified by



opportunism and illiteracy. To demagoguery, for instance, and to demagoguery alone, is to be attributed last weeks episode in a coal mining district in the United States. Here a strike was imminent because of the proposed introduction of safety explosives. The incredible folly of the miners in opposing a measure calculated solely to reduce the risks under which their daily work is performed, is due, of course, to ignorant prejudice. But their leaders, often profoundly ignorant themselves, foster and encourage the ignorance, prejudice, and passions of their followers. Anyone who will take the trouble to read the official utterances of labour periodicals—and the U. M. W. A. Journal is an outstanding example—cannot but admit the justice of this indictment.

As a general proposition, it is true that the leaders of mining labour are antagonistic to the introduction of regulations, devices, and methods that are calculated to prevent loss of life. This is especially true of coal mining.

In Great Britain a temporizing government has pondered consistently to the most radical section of labour-socialists. Whilst the militarism of Germany can hold revolutionary tendencies in check, in Great Britain no such corrective is either possible or desirable. Great Britain, and all Anglo-Saxon countries, must depend primarily upon the controlling influence of educated public opinion.

Now, since mining labour is highly organized, there is present an essential need that operators and owners organize. But this organization must not be called into being as a corporate entity hostile to labour bodies. On such a foundation success would not be worth attaining. The basic problem is not one of warfare, but of co-operation—co-operation, national and international, as between mine owners first, and then as between owners and labour.

The first step in this desired consummation must be local and national union of mine owners or operators. Never was the need so apparent as it is to-day in Canada. Indeed, the value of mining investments depends more to-day upon labour conditions than ever before; and no other factor is so uncertain. Hence, if only as a business precaution, it is incumbent upon mine owners to get together and stay together. Only by mutual trust and concerted action can mine owners hope to guard their interests adequately. And only by temperate methods, wise forbearance, and the dissemination of right knowledge can the confidence of organized labour be won.

Meanwhile it is pertinent to observe that Canadian mine owners will never have as fair an opportunity of organizing as is offered them by present conditions.

## EDITORIAL NOTES.

The latest news from Gow Ganda is encouraging. Four new substantial discoveries are announced, one of which is that of a silver vein encountered at a depth of one hundred feet.

It is rumoured unofficially that the royalties exacted by the Ontario Government from certain Cobalt mines are to be reduced considerably. This is unquestionably a move in the right direction. Apart from all consideration of business ethics, it is and has been a doubtful method of raising income for the province.

The cost of mining coal in Great Britain is fast reaching a point when the profit to the operator will disappear. When that time shall have arrived, it appears probable that power will be generated at the pit-mouth and distributed over Great Britain from enormous central stations. Some such change must take place within a comparatively short time.

The Elmore vacuum-flotation process is based primarily upon the selective action of oil for metallic mineral particles in a flowing pulp of crushed ore and water. The addition of acid materially increases this action. The air or gases dissolved in water are partly or wholly liberated upon lessening the pressure below that of the surrounding atmosphere. Gases, also, may be generated in the pulp, or by introduction from an external source. The bubbles of gas attach themselves to the oiled mineral particles and cause them to float to the surface of the liquid. The quantity of oil and acid necessary ranges from 3 to 10 lb. per ton of ore treated. A large variety of cheap oils and residuums have proved suitable.

About 70 machines are now in use or under construction. An extraction of 98.8 per cent. is recorded on a 3.48 per cent. copper ore in which barytes formed the gangue. For a 3.40 per cent. molybdenite ore, feldspar gangue, on extraction of 93.2 per cent. was obtained. Gold, silver, lead, antimony, zinc, graphite, ores and tailings have been successfully treated. In one copper mine where three units are installed, the working costs are about 75 cents per ton of ore treated. At another mine, one unit handles from 120 tons to 200 tons per week. The ore in this instance carries 0.75 per cent. copper and is concentrated to 16 per cent., leaving 0.14 per cent. in the tailings. The approximate working cost (not including general management) is 24 cents per ton. Other much lower costs are recorded.



# MODERN PRACTICE OF ORE-SAMPLING.

Advance Copy of Paper to be Read Before the American Institute of Mining Engineers, Spokane Meeting, September, 1909.

By David W. Brunton, Denver, Col.

From the old-fashioned "grab-sample" to the modern timing-device, which takes a machine-sample with mathematical precision, there is a wide gap which was only crossed by many years of toil and unremitting endeavor. Even to-day, notwithstanding the advancement in the art, "grab-sampling" is still practised—some times to afford the unscrupulous mine-promoter a basis for fairy-tales with which to entrap the too-gullible investor, and often by milling and smelting companies to determine the amount of moisture in custom ores. The latter practice is almost as reprehensible as the former, and it causes more trouble and ill-feeling between seller and buyer than all other factors put together. No reputable concern to-day would think of attempting to determine by grab-sampling the amount of gold, silver lead, or copper contained in an ore, and yet many buyers expect the miner to accept the results of grab-sampling in the determination of the amount of water contained in the ore, forgetting that accurate results are just as necessary here as in the determination of the metals, because the result determines the percent-



FIG. 1.—SAMPLE BISECTED BY A SHEET OF GLASS, SHOWING PROPORTION OF COARSE AND FINES.

age of weight of the ore which shall be excluded and considered to have no value whatever.

Samples for the determination of moisture should be taken with as great care as samples for the determination of metallic content, and in order to avoid the extra expense of a separate operation moisture-samples should be taken from the sample-safe. As the sample reaches the sample-bin in a smaller stream and by a more circuitous route than the "reject" travels in its path to the outgoing car, it loses more moisture en route, and a constant should be added to compensate for this difference. Carefully conducted experiments have shown that the difference in loss of moisture between the two routes does not exceed 10 per cent. in summer and 7 per cent. in winter. For instance, a lot of ore shipped during the summer months, in which the machine sample showed 5 per cent. of moisture, would have an actual moisture content of 5.5 per cent. Grab-sampling by an interested party, at its best, is only a prejudiced conjecture, while at its worst it gives rise to the most unscrupulous practices with which the ore producer and the mining investor have to deal.

Shovel sampling, another archaic method which is still used in some localities, consists in throwing out from the car or wagon every third, fifth, or tenth shovelful for a sample. As the portion of the pile from which the



FIG. 2.—SAMPLES SPREAD OUT INTO A PANCAKE.

sample is taken is entirely at the discretion of the operator, the process would be more properly named fifth-shovel selection than fifth-shovel sampling. Between the conscientious workman who endeavours to be absolutely upright, and often becomes, as the Scotchman said, "maer than plumb," and the scheming labourer who, desiring to make his "job solid," takes a "safe sample," there is little room for truth or accuracy in this method, and the sooner it is consigned to oblivion the better for every one concerned.

Thirty years ago Cornish quartering was the almost universal method of sampling in use, and it is still employed to a considerable extent in cutting down machine samples and in mine examinations where no machinery can be had. When properly carried on with skill, care, and common honesty, fairly good results may be obtained by quartering, but between the possibility of accidental



FIG. 3.—SAMPLE CONED AROUND A ROD.

mistakes and the opportunities which it affords for skillful and unscrupulous operators to manipulate the sample, it has fallen almost into disuse, and should have been completely abandoned long ago. The inherent



defect of this system lies in the fact that piling a lot of ore in the form of a cone does not mix it, as the advocates of this system claim. Dropping shovelful after shovelful of ore on top of a cone, instead of building up a homogeneous pile, actually produces a very perceptible sorting action, whereby the fines build up where they fall on the center of the cone and the coarser particles roll outward and down the sides. This is illustrated in

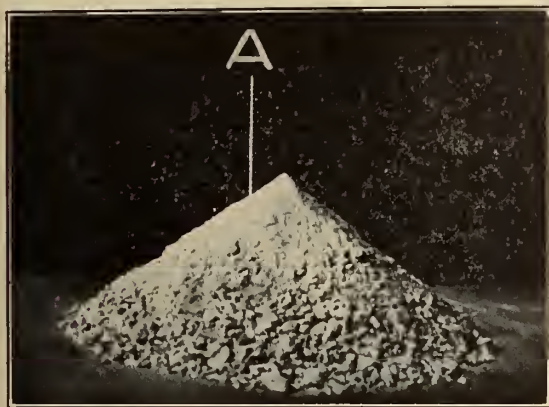


FIG. 4.—SAMPLE CONE WITH DRAWN CENTER.

Fig. 1, which is a half-tone from a photograph of a cone built up in actual sampling practice and bisected by a sheet of glass. This section shows conclusively the great difference in the relative proportion of coarse and fines between the outer and inner portions of the cone, and also makes it perfectly clear that even after the cone has been spread out into a pancake, as shown in Fig. 2, the fines in the lower portion of the cone will be entirely undisturbed. The most uniform and best results are obtained by cining around a rod, as shown in Fig. 3. By this means the center of the cone is maintained in a vertical line, and if care is taken in working down the cone to a "pancake," as shown in Fig. 2, and separating the quarters by steel blades, so that there is no difference between the quadrants taken for the sample and those thrown into the reject, the results give a fair approximation of the truth, though it is not possible to duplicate results very closely by this method, even at its best.

It would take altogether too much space here to enumerate the different schemes which unprincipled

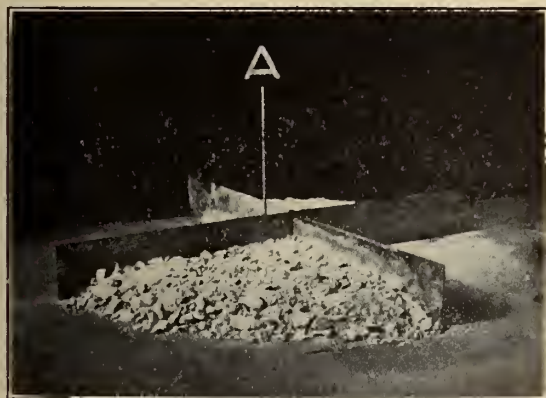


FIG. 5.—SAMPLE WITH DRAWN CENTER SPREAD OUT.

operators have introduced into this method for the purpose of "throwing" the sample, and description of one of them will suffice.

The most ingenious of these plans, and one which is so difficult to detect that it can be carried on directly

under the eyes of a skilled observer without detection, is what is known as "drawing the center." The cone is started on the floor, as shown in Fig. 3, but without any rod to determine the position of the center. The operator in charge of the work, in dropping his shovelfuls of ore on the top of the cone, does it in such a manner as to draw the center of the cone imperceptibly in a certain direction, so that by the time the entire sample is piled and ready for spreading, the apex of the cone, shown in Fig. 4, is several inches, we will say, to the SE. of the original center, which is indicated by the perpendicular line, A. The ore may now be spread as usual with shovels or with a board, and cut and marked into quadrants by steel blades in alignment with the four points of the compass, as shown in Fig. 5, where the rod, A, indicates the original center of the cone, which, of course, has been entirely undisturbed by the mixing and spreading of the upper portion. By rejecting the NW. and SE. quarters an excess ratio of the fines is eliminated, and since these are generally the richest ore the metallic contents of the two retained quadrants, shown in Fig. 5, will be somewhat less than the average of the original pile. Suppose a 2,000-lb. lot is to be reduced to 62.5 lb., it would mean that the "quartering" (really halving) would have to be repeated five times, and if at each stage the sample taken represented 98 per cent. of the actual value of the cone, the final sample would only give 90.3



FIG. 6.—U-SHOVEL SAMPLING.

per cent. of the true value of the cone, as shown in the following tabulation:

|                           | Original Lot. | First Cut. | Second Cut. | Third Cut. | Fourth Cut. | Fifth Cut. |
|---------------------------|---------------|------------|-------------|------------|-------------|------------|
| Weight, lb.,              | 2,000         | 1,000      | 500         | 250        | 125         | 62.5       |
| Percentage of true value, | 100           | 98         | 96          | 94.1       | 92.2        | 90.3       |

The shifting of the cone-center is easily carried out; in fact, it is difficult to avoid it unless some definite means of preventing it is adopted. Fig. 1 shows very clearly the structure of a cone with a "drawn" center, and in this instance the effect was entirely unintentional.

The irregularities in the results obtained by Cornish sampling, together with the cost of operation and the amount of room required, soon brought about what is known as "split-shovel" sampling, in which the ore is thrown from a broad shovel, handled by one operator, upon a narrow "U"-shaped shovel, held by another workman, usually directly over a car or wheelbarrow, as shown in Fig. 6. This method, while it requires two men to do what normally appeared to be the work of one, was cheaper than Cornish quartering, but it proved no great improvement over the latter in point of accuracy, since carelessness in almost any direction interferes seriously with the results.



The earliest attempts at mechanical sampling were made by subdividing a falling stream of ore; a process based on the supposition that an ore-stream could be mixed so as to be perfectly homogeneous. Both analysis and experience have shown that this ideal condition is impossible, and mechanical devices for taking a portion of the ore-stream all of the time have been almost entirely displaced by machines designed to take all of the ore-stream for a portion of the time. It is not practicable to produce a stream of ore which shall be continuous in value through every part of its length any more than

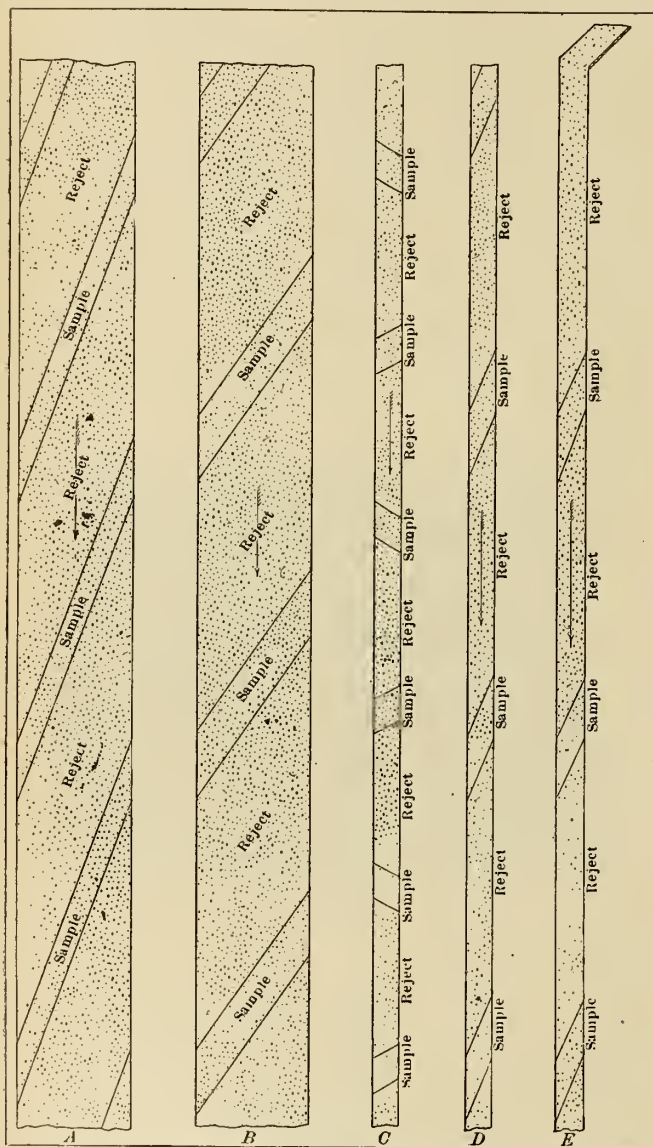


FIG. 7.—SHAPES OF SAMPLE-SECTIONS TAKEN BY THE CHARLES SNYDER, BRUNTON, AND VEZIN SAMPLERS.

it is possible to produce a stream of ore that is constant in value throughout its width; but by taking a small sample entirely across a falling stream at very short intervals it is found that, while no single cut would give an exact representation of the composition of the entire lot, the average of thousands of these small samples is so nearly correct that results can be duplicated within very narrow margins, or, in other words, that individual errors are balanced. This was not the case with the devices used for taking a portion of the stream all the time, since the errors due to feed, inclination of spouts, or wear on the bottoms of the spouts are constant, and do not vary during the time the samples are being taken.

Almost coincidental with the discovery of the fact that accurate samples could be obtained by taking all of the stream for a portion of the time, came a very considerable improvement in rock-crushing machinery, so that the modern engineer has a much better opportunity to construct a satisfactory plant than the builder had 20 or 30 years ago. Not only are the rock-breaker and rolls of to-day greatly improved in design, but the manufacturers have availed themselves of modern cheap steel to give all parts an excess of strength over any possible strain, while the use of alloy-steels for the wearing surfaces permits the machines to be kept in much better repair, and requires fewer stoppages for renewals. For sampling-work, crushers and rolls can now be had which are almost as well made as the ordinary steam engine, and so designed as to give complete accessibility for renewals and for cleaning.

Gyratory breakers of the Gates type have the advan-

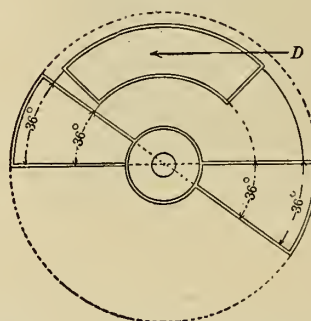


FIG. 8.—DELIVERY-SPOUT OF CHARLES SNYDER SAMPLER. CUTTING-EDGES RADIAL.

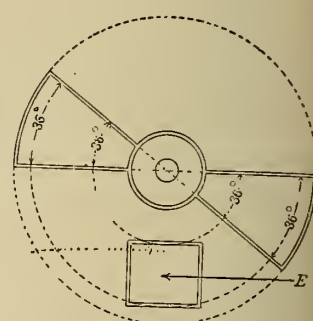


FIG. 9.—DELIVERY-SPOUT OF VEZIN SAMPLER. CUTTING-EDGES RADIAL.

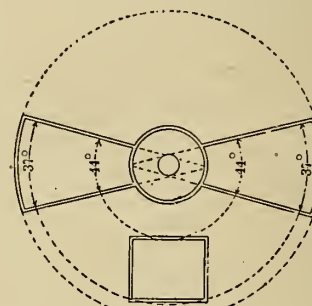


FIG. 10.—CUTTING-EDGES NOT RADIAL.

tage of delivering a very uniform product, and in crushing ores that are hard and dry this type forms by all odds the best initial crushing machine; but with ores that carry wet clay, slate or other substances which will "pack," it is necessary to use a swinging-jaw crusher, preferably of the Blake type. Rock-breakers may be set to crush to any desired fineness, but it has been found that too great a reduction in the size of the product very materially reduces the capacity. In large crushers it is not usually advantageous to attempt to crush below 2 inches in size.

First-class rolls are now always belt-driven, which eliminates the noise and danger attending the operation of the old-fashioned trains of gears. The best practice in roll-crushing is to crush not smaller than half the diameter of the particles fed to any given machine. This rule gives approximately the maximum crushing capacity with the minimum production of fines and the lowest expenditure for power and metal. Rolls require a steady feed, and one which is uniform across the entire width of the shell; consequently, nearly all modern rolls are



equipped with some feeding device. In sampling mills the shaking-tray is generally used on account of the ease with which such feeders can be cleaned after each lot of ore has been run.

For fine-grinding machines, the coffee-mill type still successfully holds its own against most of the newer devices, although the modern sample-grinder is much heavier, better built, and more easily cleaned than its predecessors.

The first mechanical samplers were imitations of Cornish quartering, the "whistle-pipe" being the most common type. With ore finely crushed, fairly dry, well-mixed, and entirely free from strings and rags, and with the dividers new and exactly centering the pipe, fairly good results could be obtained by this method; but as these conditions never existed in practice, and as the edges of the cutters wore rapidly, thereby moving the dividing-line back from the center, this form of sampling-machine was soon discarded, and I believe has now fallen into absolute disuse.

Following the whistle-pipe sampler came the various forms of mechanical split-shovels; but as there was no place in a spout, no matter how wide or carefully built, where a single "U"-shaped spout could be placed to take a sample which would represent the entire width of the stream, this form also was soon discarded.

More recently this splitter has been revived by an adaptation of the ordinary hand-operated splitter (see Fig. 12), in which numerous small spouts are so arranged across the entire width of a larger one that the main ore-stream is divided into a great number of smaller ones, the even numbers being deflected to the right and the odd numbers to the left. This plan works very well on the first division, but as it effects a reduction of only 50 per cent. in the volume, the operation must be carried further, and the streamlets forming the sample centered into a broad stream, which, in turn, passes over another set of splitters, the operation being repeated as often as necessary to reduce the sample to the desired size. It has been found, however, that the mixture of the streamlets after their union is far from perfect, and that there is a considerable difference in the amounts of coarse and fines taken by the sample side of the second cutter, depending on its position relative to the cutter above. If the sample-compartments in the second cutter are directly below the sample-compartments in the overlying splitter, they receive the centers of the streamlets, while the "spread" passes into the reject, and the sample at each step in the bank of cutters receives an amount of fines slightly in excess of the average, thereby seriously affecting the value of the sample, provided there is, as is usually the case, a difference between the metallic contents of the coarse and the fines. Conversely, when each cutter in the bank is placed so as to take the "spread" from the cutter above it, the sample will have less than its due proportion of fines. This disadvantage could be obviated by placing a shaking-tray between each set of dividers, or perhaps even better by moving one divider horizontally across the other, so that each set of cutters would take all parts of the streams from the cutters above them. This arrangement, however, would require considerable head-room, and give a machine which would make a large amount of dust—a feature which is always objectionable in a sample-room.

The latest types of samplers are designed to overcome the difficulties just described, and are usually known as "time-sampling machines," from the fact that they deflect the entire stream into the sample-compartment

for a varying portion of the time, depending on the percentage of sample required. Treating the falling stream of ore as a ribbon, they cut sample-sections directly across its entire width, these portions varying in shape and size with the mechanism employed. Of the many types that have been invented and patented, only three have come into general use, and Fig. 7 shows the shapes of the sample-sections taken by these three machines.

A represents a sample cut from the falling stream of ore by the Charles Snyder 20 per cent. sampler, with four radial intake-spouts, making 7.5 rev. (or 30 samples) per minute; delivery-spout 5 by 25 inches. (This sampler is not to be confounded with the Snyder sampler.) It will be seen, on this machine, that an attempt has been made to combine the old-fashioned continuous sample with the time-sampling system by arranging the delivery pipe and intake-spouts so that as one intake-

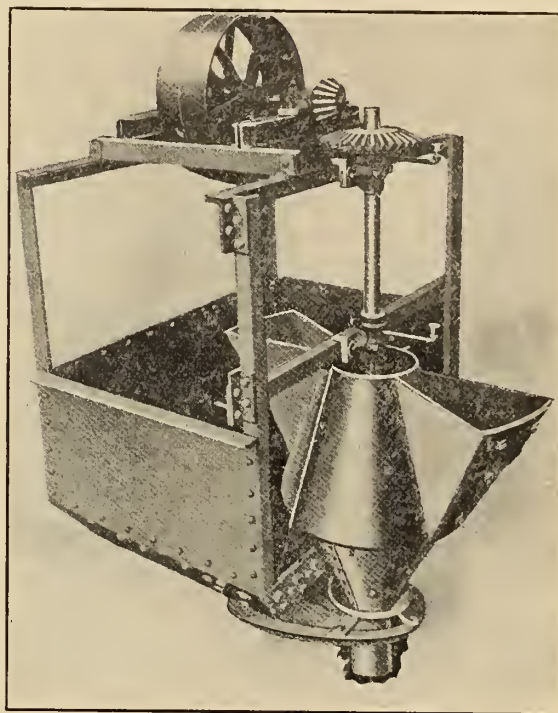


FIG. 11.—VEZIN SAMPLER, SHOWING HORIZONTAL CUTTING-EDGES

spout passes out of the stream another enters it on the opposite side.

B represents a Charles Snyder 20 per cent. sampler, with two radial intake-spouts, taking 15 samples per minute; delivery spout 5 by 25 inches. This machine does not take a continuous sample, but has the advantage that the intake-spouts, for a given percentage of sample, have double the width, and are therefore much less liable to throttle or choke; at the same time there is no reason why the sample should not be as accurate as that taken with the other type of Charles Snyder sampler.

C represents the sample taken by the Brunton 20 per cent. sampler, taking 54 samples per minute; delivery-spout 5.75 by 5.75 inches, cutting edges parallel.

D represents the sample from a Vezin 20 per cent. sampler with two radial intake-spouts, taking 30 samples per minute; delivery-spout 6 by 6 inches.

E shows the sample taken by a modified form of sector sampler, which, often through accident and sometimes by design, has come into too general use.

Both the Charles Snyder and the Vezin samplers have sector intake-spouts revolving on a vertical axis,



the only difference between the machines being that the delivery spout in the Snyder sampler is an annular quadrant, *D*, in Fig. 8, while the Vezin delivery pipe is either square or rectangular, *E*, in Fig. 9. In order to take a correct sample the cutting edges of the sector intake-spouts on both of these machines must be exactly radial, as shown in Figs. 8 and 9, otherwise they will include more degrees of arc at one part than at another; and consequently the percentage of sample taken from all parts of the delivery pipe will not be the same, as is shown by Fig. 10, in which the cutting edges are not radial to the center of rotation. This, while by no means an exaggerated example of this form of distortion, shows a 74/360, or 20.8 per cent., sample taken on one side of the ore-stream and 88/360, or 24.4 per cent., on the other. If the falling stream of ore were perfectly homogeneous this arrangement would not make any difference, but it is well known that the ore-stream is not uniform, especially in an inclined spout, in which the coarse, rapidly moving particles go bounding along on the top, while the finer portions hug the bottom, and on leaving the spout the coarse is projected a considerable distance and

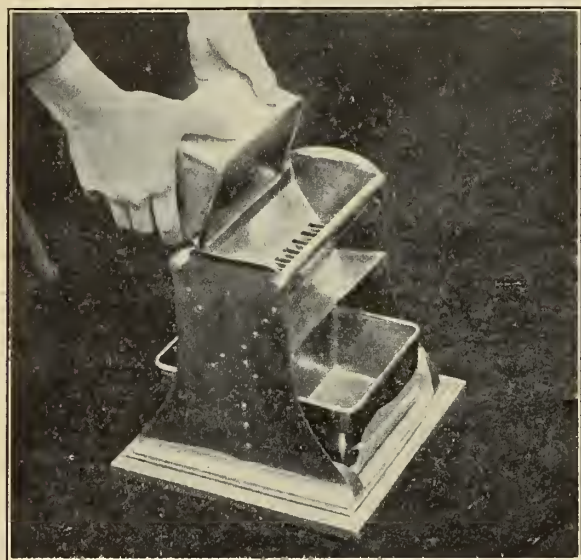


FIG. 12.—TAYLOR & BRUNTON SPLITTER.

the fines drop almost vertically, which gives a sorted falling stream, with coarse on one side and fines on the other. With a tangential feed to a sector intake this sorting machine does not seriously affect the sample if the delivery spout is perfectly level and free from ridges which would deflect the particles across the stream; but with a radial feed used, as shown in Fig. 9, and the intake sample spout edges not radial, as shown in Fig. 10, it will readily be seen that a larger proportion of coarse than of fines is taken into the sample.

Since the cutting edges of this class of samplers, Fig. 11, are necessarily maintained in a horizontal position, they are very liable to become overhung with strings, burnt fuse, and drill rags, which the mill attendants often endeavor to remove by pounding the sides of the spout while the machine is in motion, thereby distorting the form of the intake-spout very considerably from a true sector, and rendering it impossible to obtain a correct sample unless the delivery-stream is perfectly homogeneous, which is never the case. The great length of the radial edges of the sector intake-spout renders them, of course, peculiarly susceptible to be thrown out of alignment, and manufacturers of this class of machines

should do something to shorten up the length of the radial edges, or stiffen them to prevent accidental distortion. At first sight it might be thought that this could be accomplished by reducing the size of the sector, but experience has shown that the width of any spout, deliv-

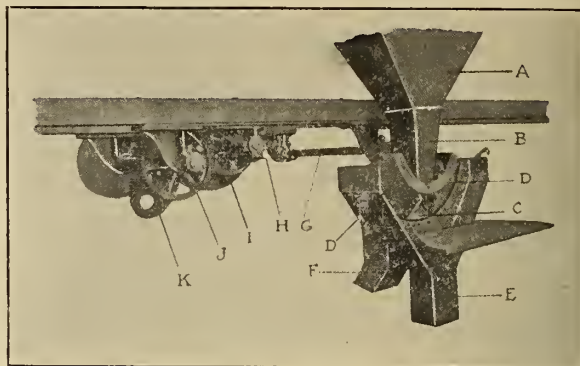


FIG. 13.—THE BRUNTON TIME-SAMPLER. FRONT VIEW.

ery, or intake should be something more than three times the greatest diameter of the coarsest particle passing through it; otherwise, a bridging effect occurs which affects the flow and often chokes up the spout. It is, therefore, good practice to make the width of the feed and intake-spouts four times the diameter of the coarsest particles passing through them.

The Brunton time-sampler oscillates in a vertical plane through an arc of 120 degrees instead of revolving in a horizontal plane like the sector-intake machines, an arrangement which permits the use of a rectangular intake-spout with cutting-edges so short that accidental distortion is impossible, while the tilting of the cutters at the end of the swing materially assists in dislodging any rags or strings which may have fallen on the cutting-edges. This construction requires less head-room than any other system, which effects a great saving in the cost of mill construction, since it not only reduces the necessary height of the building, but shortens all spouts and conveyors. The design of this machine cannot be very clearly shown in a linear drawing, but may be readily understood from Fig. 13, which is a front view of the sampler, having the housing open for cleaning, and Fig. 14, which is a rear view. The various parts are explained as follows: *A*, receiving hopper from crusher or rolls; *B*, delivery-spout; *C*, sample-intake; *DD*, "reject"

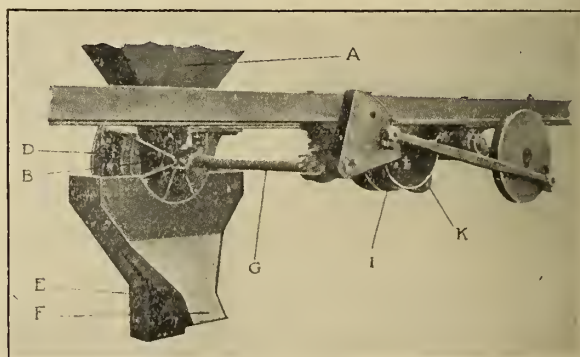


FIG. 14.—THE BRUNTON TIME-SAMPLER. REAR VIEW.

divisions; *E*, housing-spout leading to the sample-bin; *F*, reject-spout leading to the shipping-bins; *G*, oscillator-shaft; *H*, gear-shift; *I*, driving-pulley; *J*, spur-gear; *K*, eccentric gear. Ordinarily the machine is driven by the spur-gear, *J*, in which case a 20 per cent. sample is taken,



but when a 5 per cent. sample is required the gear is slipped along the shaft, disengaging the spur and bringing the eccentric gear, *K*, into play. Another advantage in the use of this machine is that, as the discharge of the ore from the sampler is assisted by centrifugal force instead of being retarded thereby, as is the case with all sector machines, it can be run at a much higher rate of speed, thereby increasing the number of samples per minute. This arrangement insures greater accuracy, since the more samples which can be cut from the falling ribbon without "batting" the ore too vigorously with the sides of the cutters, the better are the chances for obtaining an exact average of the stream. A study of

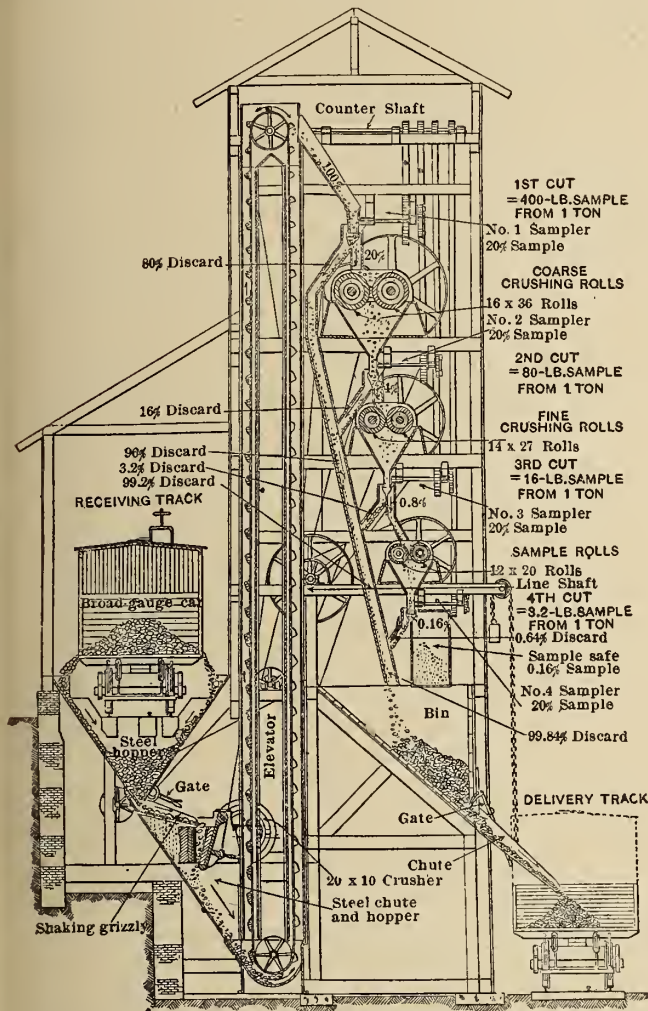


FIG. 15.—TAYLOR & BRUNTON SAMPLING-SYSTEM.

the relations between oscillator, rocker-arm, and disc-crank, Fig. 14, will show how this device takes a comparatively small sample with a large intake-smpout.

While there seems to be a general impression among mining men that high-grade ores are more difficult to sample correctly than those of low grade, there is no reason for this assumption. The difficulty of sampling accurately increases directly as the difference between the value of the highest and the lowest grade material contained in the lot, and is at its maximum when the values are carried in large masses of metallics or crystals of very rich minerals occurring in barren rock.

If we imagine a lot, for instance, of Cripple Creek ore, composed entirely of barren gangue and one solitary piece of calaverite, it would be manifestly impossible to

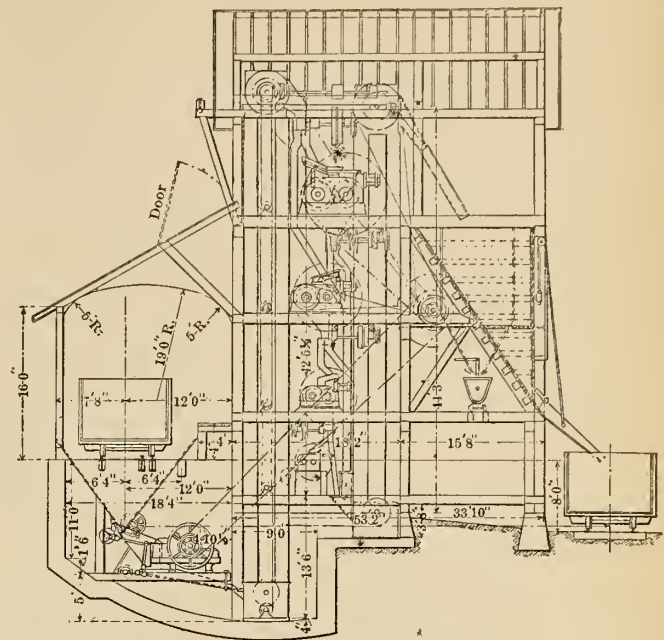


FIG. 16.—VERTICAL SECTION OF THE TAYLOR & BRUNTON SAMPLING-MILL,  
SILVER CITY, UTAH.

sample such a lot of ore without crushing, since in any subdivision either the sample or the reject would contain all of the mineral.

Suppose this lot to be subjected to a slight crushing and the solitary piece of mineral broken into three fragments, then dividing the lot into halves would at the best throw 50 per cent. more value into the one half than into the other; it is therefore clearly manifest that in order to obtain a sample which shall correctly represent this or any other lot, it is necessary to crush it to such a degree of fineness that one particle more or less taken into the

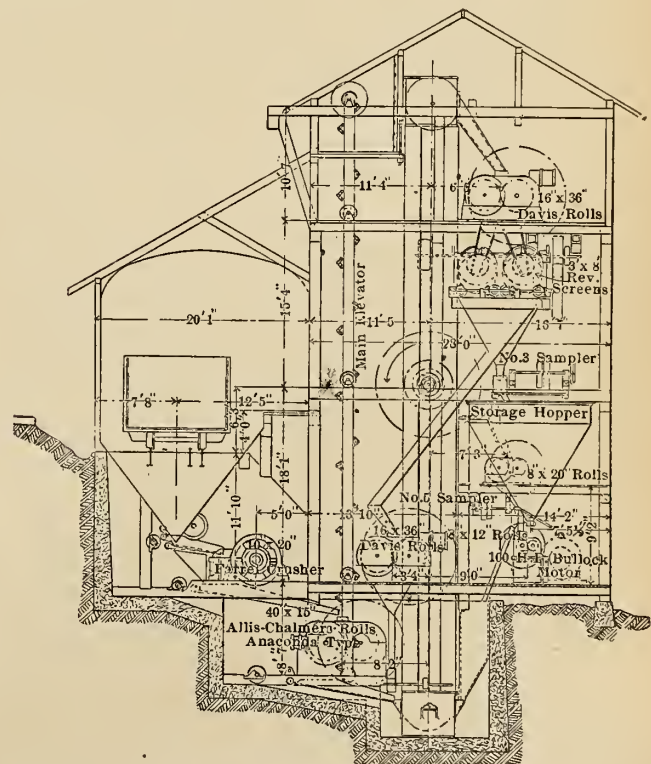


FIG. 17.—VERTICAL SECTION OF THE MATTE AND SULPHIDE SAMPLING-MILL  
OF THE TINTIC SMELTING CO., SILVER CITY, UTAH.



## TAYLOR &amp; BRUNTON SAMPLING WORKS, SILVER CITY, UTAH.

Calculations based on 25 ton lot. Capacity 60 tons per hour.

3 rail receiving tracks R.O.W., San Pedro and Eureka Hill Rys.

Steel ore hopper under railway tracks 14' 6" wide x 15' 0" long.

Shaking grizzly separating coarser and fines.

10" x 20" Farrel-Bacon crusher crushing to 2-1/2" cubes. 250 RPM.

Shaking tray elevator feeder 1-1/4" stroke. 250 RPM.

55' 0" vertical elevator belt 20", buckets 6" x 18". Speed 375 RPM.

No. 2 Brunton 20% Sampler 7" C-C 19 RPM.

Reject 80% 20% Sample = 10,000 lbs. = 1/3500.

Shaking tray roll feeder 3/4" stroke. 235 RPM.

16" x 36" Davis belted rolls crushing to 1" cubes. 50 RPM.

No. 3 Brunton 20% Sampler 5-3/4" C-C. 20 RPM.

Reject 16% 4% Sample = 2000 lbs. = 1/11,000.

Shaking tray roll feeder 5/8" stroke. 235 RPM.

15" x 27" Gates belted rolls crushing to 3/8" cubes. 68 RPM.

No. 4 Brunton 20% Sampler 4-1/2" C-C. 26 RPM.

Reject 3.2% 0.8% Sample = 400 lbs. = 1/42,000.

Shaking tray roll feeder 1/2" stroke. 180 RPM.

8" x 20" Davis belted rolls crushing to 1/8" cubes. 80 RPM.

No. 5 Brunton 20% Sampler 3-1/2" C-C. 33 RPM.

Reject 0.64% 0.16% Sample = 80 lbs. = 1/240,000.

Shaking tray roll feeder 1/2" stroke. 185 RPM.

8" x 12" Davis finishing rolls crushing to 14 mesh. 100 RPM.

Locked steel sample safe.

Covered steel sample buggy.

Locked cutting room with steel floor and observation windows.

T. &amp; B. precision 3/4" div. splitter to 10-12 lbs. = 1/1,100,000.

Electric drier. Temperature 250° F.

Two Engelbach grinders to 50 mesh cone makers, 86 RPM.

1/2" division T. &amp; B. precision splitter to 20-24 ozs. = 1/7,000,000.

Bucking Board to 120 mesh.

Rubber rolling cloth five minutes.

1/4" div. T. &amp; B. precision splitter to 4 sample sacks 5-6 ozs. each.

FIG. 18.—FLOW-SHEET, TAYLOR &amp; BRUNTON SAMPLING WORKS, SILVER CITY, UTAH.

## SYNOPSIS OF MACHINERY AND METHODS.

## MATTE &amp; SULPHIDE MILL, TINTIC SMELTING COMPANY.

Calculations based on 25 ton lot. Capacity 30 tons per hour.

5 rail tracks, R.O.W., San Pedro and Eureka Hill Rys.

Steel receiving hopper under railway tracks, 14' 6" wide x 15' 0" long.

Shaking grizzly separating coarser and fines.

10" x 20" Farrel-Bacon crusher, 250 RPM, crushing to 2" cubes.

Shaking tray roll feeder 1-1/4" stroke. 250 R.P.M.

15" x 40" Allis-Chalmers, Anaconda Type, belted rolls, 45 RPM, crushing to 1" cubes.

Shaking tray elevator feeder 1-1/4" stroke. 250 R.P.M.

55' 9" C-C elevator belt 20", buckets 6" x 18". Speed 355' F.H.

16" x 36" Davis belted rolls, 50 RPM., crushing to 1/2" cubes.

2 revolving screens each 30" dia. 8' 0" long, 2-1/2 mesh, 1/4" opening.

Sized Product

Over-size

No. 3 Brunton 2% Sampler 15 RPM 2-5/16" C-C of cutting edges.

16" x 36" Davis finishing rolls, 50 RPM, 1/4" cubes.

Reject 98%

2% Sample

Elevator

Storage hopper

Robbins belt

Sulphide beds

Shaking tray transfer feeder 1/2" stroke. 180 RPM.

8" x 20" Davis belted sample rolls crushing to 5 mesh. 75 RPM.

No. 5 Brunton 10% Sampler, 31 RPM, 1-3/4" C-C

Reject 1.8%

0.2% Sample = 100 lbs. = 1/440,000.

Auxiliary hopper and run to

storage hopper during cleanup.

Shaking tray roll feeder 1/2" stroke. 185 RPM.

8" x 12" Davis finishing rolls crushing to 14 mesh. 100 RPM.

Locked steel sample safe

Covered sample buggy.

Locked cutting room with steel floor and observation windows.

T. &amp; B. precision splitter to 10-12 lbs. = 1/1,100,000

Covered and locked steel buckets to grinding room in sampling mill.

FIG. 19.—FLOW-SHEET, TINTIC SMELTING CO., SILVER CITY, UTAH

## SYNOPSIS OF MACHINERY &amp; SAMPLING SYSTEM

## AT THE WESTERN ORE PURCHASING CO.'S WORKS, MILLERS, NEVADA.

Computations based on 25 ton lot. Capacity 70 tons per hour.

On main line of Tonopah &amp; Goldfield Railroad Co.

Four storage tracks, 6000 feet private track.

Receiving Hopper under railroad track.

Power 75 H.P. Westinghouse Motor. 710 R.P.M. 2200 Volts

Two No. 4 Gates crusher, 21" Style K, crushing to 3" 420 RPM

Elevator 71' 6" C-C. Buckets 16" x 6" x 8". Speed 420' P.M.

No. 1 Special 20% C. Snyder Sampler, delivery spout 7" x 35" 10 RPM.

Discard 80% 20% Sample = 10,000 lbs. = 1/7,000.

16" x 36" Davis belt-driven rolls, crushing to 1". 70 RPM.

Elevator 31' 3" C-C. Buckets 4" x 8" Speed 340' P.M.

No. 1 Chas. Snyder 20% Sampler, delivery spout 5" x 25". 10 RPM.

Discard 16% 4% Sample = 2000 lbs. = 1/11,000.

14" x 30" Davis belt-driven rolls, crushing to 3/8". 110 RPM.

Elevator 28' 9" C-C. Buckets 3" x 5". Speed 340' P.M.

No. 2 Chas. Snyder 20% Sampler, delivery spout 3" x 15". 10 RPM.

Discard 3.2% 0.8% Sample = 400 lbs. = 1/42,000.

12" x 20" Davis belt-driven rolls, crushing to 6 mesh. 110 RPM.

No. 3 Chas. Snyder 20% Sampler, delivery spout 2" x 10" 10 RPM.

Discard 0.64% 0.16% Sample = 80 lbs. = 1/670,000.

Sample Hopper car, bottom discharge.

Enclosed Sample Room. 10 H.P. Motor 710 R.P.M.

7" x 14" Stearns-Roger rolls, crushing to 8 mesh. 150 RPM.

3/4" div. riffle box to 50-150 lbs. = 1/1,040,000.

Regrind through closed 7" x 14" rolls, to 16 mesh.

Grinding Room.

1/2" div. riffle box to 12-15 lbs. = 1/1,600,000.

Electric drier. Temperature 240°-380° F.

Two No. 2 Engelbach Grinders to 50 mesh. Speed 60-130 RPM.

Rubber rolling cloth three minutes.

1/2" div. riffle box to 20-25 ounces = 1/7,000,000.

Grinder and Bucking Board to 120 mesh.

Rubber rolling cloth 10 minutes.

1/4" div. riffle to 4 sample sacks 5.5 ounces each

FIG. 20.—FLOW-SHEET, WESTERN ORE PURCHASING CO., MILLERS, NEV.

## SYNOPSIS OF MACHINERY AND METHODS AT

## THE AMERICAN S. &amp; R. COMPANY SAMPLER No. 2, MURRAY, UTAH.

Computations based on 25 ton lot. Capacity 50 tons per hour.

Rio Grande Western &amp; S. P. L. A. &amp; S. L. Railways.

Stub end elevated receiving track 10' above mill floor.

Wide chute at level car floor, feeding direct to crusher.

Gates crusher #4 style D, crushing to 3".

Ninety foot elevator, buckets 6" x 8" x 12".

Vezin 20% 20" radius double spout sampler. 13 R.P.M.

Reject 80% 20% sample = 10,000 lb. = 1/2000.

Gates crusher #2 style H, crushing to 1-1/4".

Vezin 20% 20" radius sampler.

Reject 16% 4% sample = 2,000 lb. = 1/5000.

16" x 36" Gates belted rolls, crushing to 3/4"

70 foot elevator 4" x 4" x 6" buckets.

Vezin double spout 20% sampler.

Reject 3.2% 0.8% sample = 400 lb. = 1/5300.

12" x 20" high-speed Allis Chalmers rolls, crushing to 3/8"

Vezin double spout 20% sampler.

Reject 0.64% 0.16% sample = 80 lb. = 1/8500.

Steel safe in grinding room.

Entire sample carried over to #3 mill.

Run through 12" x 20" rolls, crushing to 3/16".

3/4" Rhodes splitter to 75 lb. = 1/62500.

Surfaces dryer in #4 mill grinding room.

Two Engelbach grinders to 50 mesh.

1/4" riffle to 48-50 ounces = 1/16,000,000.

Bucking board to 100 mesh Ag. and 120 mesh Au.

Gold pan mixing five minutes.

1/4" riffle to four 8 oz. pulp samples.

FIG. 21.—FLOW-SHEET, AMERICAN SMELTING &amp; REFINING CO., SAMPLER No. 2, MURRAY, UTAH.



sample shall not materially affect its metallic content. In other words, the maximum error is determined by the ratio of the weight of the largest particle of metal or high-grade mineral to the weight of the entire lot. At this point another condition must be considered. In any lot of ore it is easy to see that the chances of finding a full-sized piece of the highest grade material would be much greater on a lot of ore crushed to 0.25 inch cubes than in a lot crushed in 1-inch cubes, therefore accuracy demands that the ratio between the weight of the largest particle and the entire lot shall increase directly as the fineness.

In this particular, practice and theory are in complete accord, and all of the latest and most improved mills practise alternate crushing and subdivision from the coarsest size down to the finest. It is customary at each successive stage to reduce the diameter of the coarsest particles one-half, thus decreasing the volume to one-eighth, or 12.5 per cent. The usual sample taken at each successive stage is 20 per cent., so that while the size of the particle at each step has been reduced 12.5 per cent., the amount of sample taken is 20 per cent., consequently the ratio between the weight of the largest particle and the weight of the sample rises steadily from the beginning of the series of operations to the end, thereby meeting the conditions theoretically necessary to an accurate determination of value.

An ideal sampling mill, where the situation and nature of the service will permit this form of construction, is shown in Fig. 15. This plant is entirely automatic, and when the ore is received in hopper-bottom cars no manual handling is required at any stage, while the sample is automatically delivered into a locked steel safe. To simplify the drawing, the roll-feeders have been omitted.

Fig. 16 is a vertical longitudinal section of the new Taylor & Brunton mill at Silver City, Utah, completed January, 1909. Like the plant shown in Fig. 15, it is automatic throughout, electric driven, and contains every modern device for facilitating crushing, sampling, and cleaning, the latter operation being performed by compressed air.

A good example of a modern crushing, screening, and sampling plant is shown in Fig. 17 which is a longitudinal section through the new matte and sulphide mill of the Tintic Smelting Co. at Silver City, Utah.

In order to show the methods of operation in vogue in different districts, I present Figs. 18, 19, 20 and 21, which contain the flow-sheets of a number of the newest and largest sampling works, clearly showing every detail of the process, and the machinery employed in the alternate operations of crushing and subdivision, as well as the increase of ratio as the final stages are reached. This style of flow-sheet was originally typewritten on ordinary 8.5 by 13 inch paper, perforated for a loose-leaf binder. In this way flow-sheets of many classes of operations may be preserved in convenient form.

These flow-sheets show considerable differences at all stages, and a great divergency in the methods of subdividing the final sample. Too many manual operations are in use, and there is no doubt that the complete elimination of the personal equation by using a small Taylor & Brunton splitter with  $\frac{3}{8}$ -inch riffles (shown in Fig. 12) gives by far the most accurate subdivision.

To show how closely results between different mills and repeat-sampling in individual mills may be made to check, the following examples, taken at random, should suffice:—

TABLE I.—Sampling-Results, Taylor & Brunton Sampling Co., Cripple Creek, Colo.

| Lot No. | Sample.         | Resample.       |
|---------|-----------------|-----------------|
|         | Gold.           | Gold.           |
|         | Ounces per Ton. | Ounces per Ton. |
| 3192    | 3.62            | 3.64            |
| 3198    | 5.04            | 5.015           |
| 3219    | 2.70            | 2.67            |
| 3235    | 3.18            | 3.16            |
| 3310    | 1.17            | 1.17            |
| 3324    | 6.52            | 6.51            |
| 3340    | 0.71            | 0.78            |
| 3388    | 1.70            | 1.84            |
| 3424    | 9.24            | 9.20            |
| 3471    | 30.64           | 30.52           |

TABLE II.—Sampling-Results, Taylor & Brunton Sampling Co., Cripple Creek, Colo.

| Lot No. | Mine.              | First Sample.   |                 | Resample.       |                 | Settlement. |
|---------|--------------------|-----------------|-----------------|-----------------|-----------------|-------------|
|         |                    | Gold.           |                 | Gold.           |                 |             |
|         |                    | Mill-<br>Assay. | Mine-<br>Assay. | Mill-<br>Assay. | Mine-<br>Assay. |             |
|         |                    | Oz. per Ton.    | Oz. per Ton.    | Oz. per Ton.    | Oz. per Ton.    |             |
| 4514    | Sacramento.....    | 2.22            | 2.24            | 2.22            | 2.23            | 2.225       |
| 4604    | Little Clara.....  | 115.05          | 115.25          | 114.90          | 115.20          | 115.03      |
| 4705    | Mary Cashen.....   | 1.11            | 1.10            | 1.07            | 1.09            | 1.08        |
| 4726    | Midget.....        | 1.27            | 1.30            | 1.30            | 1.35            | 1.325       |
| 4853    | Independence, Ltd. | 1.36            | 1.35            | 1.29            | 1.30            | 1.295       |
| 4914    | Bon. King.....     | 0.53            | 0.55            | 0.55            | 0.56            | 0.555       |
| 5062    | Little Clara.....  | 1.77            | 1.72            | 1.75            | 1.74            | 1.745       |
| 5272    | Old Abe.....       | 1.27            | 1.24            | 1.27            | 1.28            | 1.27        |
| 5753    | Independence, Ltd. | 2.33            | 2.34            | 2.34            | 2.36            | 2.35        |
| 5913    | Little Clara.....  | 12.62           | 12.58           | 12.69           | 12.68           | 12.695      |

TABLE III.—Sampling-Results, Taylor & Brunton Sampling Co., Cripple Creek, Colo.

| Lot No. of Mixture. | Original Purchase. |                 | Mixture.              |                   |
|---------------------|--------------------|-----------------|-----------------------|-------------------|
|                     | Weight.            | Gold-Assay.     | Mathematical Average. | Mechanical Sample |
|                     | Pounds.            | Ounces per Ton. | Ounces per Ton.       | Ounces per Ton.   |
| 5394                | 17,588             | 0.98            | 0.996                 | 1.00              |
|                     | 9,646              | 1.17            |                       |                   |
|                     | 11,348             | 0.875           |                       |                   |
| 5496                | 17,405             | 0.98            | 0.972                 | 0.975             |
|                     | 6,615              | 0.895           |                       |                   |
|                     | 17,123             | 0.995           |                       |                   |
| 5799                | 422                | 8.24            | 2.099                 | 2.14              |
|                     | 12,851             | 2.225           |                       |                   |
|                     | 175                | 8.50            |                       |                   |
|                     | 21,278             | 1.85            |                       |                   |
| 5890                | 19,090             | 1.925           | 1.927                 | 1.93              |
|                     | 8,761              | 1.97            |                       |                   |
|                     | 8,852              | 1.89            |                       |                   |
| 3465                | 5,274              | 2.10            | 1.937                 | 1.97              |
|                     | 17,935             | 1.89            |                       |                   |
| 3678                | 3,795              | 1.88            | 1.481                 | 1.52              |
|                     | 17,122             | 1.49            |                       |                   |
|                     | 11,357             | 1.345           |                       |                   |
|                     | 6,592              | 1.465           |                       |                   |
| 3850                | 3,633              | 3.365           | 7.252                 | 7.24              |
|                     | 16,803             | 4.675           |                       |                   |
|                     | 8,360              | 5.82            |                       |                   |
|                     | 11,222             | 3.73            |                       |                   |
|                     | 3,731              | 36.445          |                       |                   |
| 4170                | 18,605             | 0.83            | 0.954                 | 0.92              |
|                     | 18,621             | 0.77            |                       |                   |
|                     | 11,937             | 1.42            |                       |                   |
|                     | 8,593              | 0.98            |                       |                   |
| 4292                | 17,848             | 1.165           | 0.982                 | 0.96              |
|                     | 15,435             | 0.615           |                       |                   |
|                     | 17,436             | 1.12            |                       |                   |
| 4319                | 4,014              | 2.835           | 2.71                  | 2.75              |
|                     | 15,611             | 2.24            |                       |                   |
|                     | 13,334             | 3.35            |                       |                   |
|                     | 11,712             | 2.58            |                       |                   |

TABLE IV.—*Sampling-Results, American Smelting & Refining Co., No. 2 Sampling-Mill, Utah, Using Vezin Samplers.*

| Number.      | Size of Lots, Tons Dry. | First Sample. |              | Resample.    |              |
|--------------|-------------------------|---------------|--------------|--------------|--------------|
|              |                         | Gold.         | Silver.      | Gold.        | Silver.      |
|              |                         | Oz. per Ton.  | Oz. per Ton. | Oz. per Ton. | Oz. per Ton. |
| 1            | 131                     | 5.18          | 1.1          | 5.02         | 1.1          |
| 2            | 138                     | 4.67          | trace        | 4.82         | trace        |
| 3            | 85                      | 2.45          | 1.0          | 2.45         | 1.0          |
| 4            | 75                      | 3.49          | 5.3          | 3.45         | 5.5          |
| 5            | 104                     | 2.48          | 1.0          | 2.41         | 1.0          |
| 6            | 138                     | 2.31          | trace        | 2.39         | trace        |
| 7            | 97                      | 2.43          | 2.0          | 2.31         | 2.0          |
| 8            | 96                      | 2.43          | 1.4          | 2.38         | 1.2          |
| 9            | 83                      | 2.47          | 1.5          | 2.48         | 1.7          |
| 10           | 91                      | 5.08          | trace        | 4.94         | trace        |
| Average..... | 103.8                   | 3.299         | 1.33         | 3.265        | 1.35         |

TABLE V.—*Sampling-Results, Western Ore Purchasing Co. Plants. Using Charles Snyder Samplers.*

| Miller's Plant :                    |  |                       |                         |                       |                         |
|-------------------------------------|--|-----------------------|-------------------------|-----------------------|-------------------------|
|                                     |  | First Sample.         |                         | Resample.             |                         |
|                                     |  | Gold. Ounces Per Ton. | Silver. Ounces Per Ton. | Gold. Ounces Per Ton. | Silver. Ounces Per Ton. |
| Lot No. 4979, Assayer A,            |  | 0.21                  | 36.45                   | 0.21                  | 36.35                   |
| Assayer B,                          |  | 0.20                  | 36.35                   | 0.20                  | 36.85                   |
| Average,                            |  | 0.205                 | 36.40                   | 0.205                 | 36.60                   |
| Columbia Plant :                    |  |                       |                         |                       |                         |
|                                     |  | First Sample.         |                         | Resample.             |                         |
|                                     |  | Gold. Ounces Per Ton. | Silver. Ounces Per Ton. | Gold. Ounces Per Ton. | Silver. Ounces Per Ton. |
| Lot No. 844, average of two assays, |  | 1.76                  | 4.50                    | 1.743                 | 4.65                    |
| Hazen Plant :                       |  |                       |                         |                       |                         |
|                                     |  | First Sample.         |                         | Resample.             |                         |
|                                     |  | Gold. Ounces Per Ton. | Silver. Ounces Per Ton. | Gold. Ounces Per Ton. | Silver. Ounces Per Ton. |
| Lot No. 1131,                       |  | 1.76                  | 4.50                    | 1.743                 | 4.65                    |

TABLE VI.—*Sampling-Results, Columbia Plant.*

| Lot Mixture No. 473.       |             |              |               |               |                 |
|----------------------------|-------------|--------------|---------------|---------------|-----------------|
| Lot Number.                | Dry Weight. | Assay Gold.  | Assay Silver. | Gold-Content. | Silver-Content. |
|                            | Pounds      | Oz. per Ton. | Oz. per Ton.  | Ounces.       | Ounces.         |
| 972                        | 78,884      | 1.91         | 1.10          | 75.33         | 43.38           |
| 961                        | 78,408      | 1.82         | 0.90          | 71.35         | 35.28           |
| 974                        | 78,837      | 1.69         | 0.80          | 66.62         | 31.53           |
| 979                        | 37,352      | 4.23         | .....         | 79.00         | .....           |
| 1145                       | 7,119       | 0.30         | 161.40        | 1.07          | 574.50          |
|                            | 280,600     | .....        | .....         | 293.47        | 684.69          |
| Mathematical average.....  |             | 2.09         | 4.89          |               |                 |
| Actual sample of mixture : |             |              |               |               |                 |
|                            | 280,364     | 2.07         | 4.83          | 290.17        | 676.29          |

Table VII. gives a comparison on a lot of Bullfrog Pioneer ore sampled at Columbia plant, and afterwards screened through a  $\frac{3}{8}$ -inch screen at Hazen; fines sold to reverberatory and coarse to blast-furnace smelters, actual weights and moistures having been determined both on the fines and the coarse, which makes a showing of a slight loss in weights.

TABLE VII.—*Sampling-Results, Columbia Plant.*

| Lot No. 1017      | Dry Weight. | Assay Gold.     | Total Gold-Content. |
|-------------------|-------------|-----------------|---------------------|
|                   | Pounds.     | Ounces per Ton. | Ounces.             |
|                   | 122,189     | 3.71            | 226.66              |
| After screening : |             |                 |                     |
| Fines.....        | 36,909      | 6.06            | 111.83              |
| Coarse.....       | 84,760      | 2.75            | 116.55              |
|                   | 121,669     |                 | 228.38              |

Table VIII. gives a comparison of assays and total ounces of gold contained in four lots of Engineers' Lease ore from the property of the Florence-Goldfield Mining Co., in Goldfield, Nev., sampled at Columbia plant and afterwards screened through  $\frac{3}{8}$ -inch screen at Hazen plant, and the coarse and fines sampled separately after screening.

The dry weights show the same in each case, due to the fact that the fines after screening at Hazen were actually weighed and moistured, thus determining the exact dry weight, which was deducted from the total purchased dry weight, making a figured dry weight of the coarse.

TABLE VIII.—*Sampling-Results, Hazen Plant.*

| Lot No.           | Dry Weight of Ore. | Assay Gold.     | Total Gold-Content. |
|-------------------|--------------------|-----------------|---------------------|
|                   | Pounds.            | Ounces per Ton. | Ounces.             |
| 861               | 70,636             | 7.26            | 256.41              |
| 872               | 72,682             | 7.45            | 270.74              |
|                   | 143,318            |                 | 527.15              |
| After screening : |                    |                 |                     |
| Fines.....        | 57,425             | 7.12            | 204.43              |
| Coarse.....       | 85,893             | 7.42            | 318.66              |
|                   | 143,318            |                 | 523.09              |
| 829               | 79,916             | 8.92            | 356.43              |
| 834               | 81,210             | 8.91            | 361.79              |
|                   | 161,126            |                 | 718.22              |
| After screening : |                    |                 |                     |
| Fines.....        | 58,396             | 9.83            | 287.02              |
| Coarse.....       | 102,730            | 8.44            | 433.52              |
|                   | 161,126            |                 | 720.54              |

TABLE IX.—*Sampling-Results, Copeland Sampling Co., Victor, Colo.*

| Using Oscillating Time-Samplers.      |                 |                             |                             |
|---------------------------------------|-----------------|-----------------------------|-----------------------------|
| Mill Mixes on Cripple Creek Gold-Ore: |                 |                             |                             |
| Lot No.                               | Weight. Pounds. | Assay Gold. Ounces per Ton. | Gold. Ounces per Ton.       |
| 603                                   | 2,237           | 17.81                       |                             |
|                                       | 1,223           | 25.685                      |                             |
|                                       | 1,705           | 67.07                       |                             |
|                                       | 5,183           | 1.25                        |                             |
|                                       | 6,846           | 2.59                        |                             |
|                                       | 10,015          | 0.485                       |                             |
|                                       | 18,488          | 1.545                       |                             |
| Mathematical average,                 | 5,322           |                             | Machine-sample of mix, 5.35 |
| 907                                   | 1,759           | 1.795                       |                             |
|                                       | 13,220          | 2.54                        |                             |
|                                       | 19,271          | 1.72                        |                             |
| Mathematical average,                 | 2.04            |                             | Machine-sample of mix, 2.04 |
| 941                                   | 16,696          | 1.28                        |                             |
|                                       | 17,179          | 0.79                        |                             |
|                                       | 15,066          | 1.50                        |                             |
|                                       | 2,729           | 1.39                        |                             |
| Mathematical average,                 | 1.187           |                             | Machine-sample of mix, 1.23 |
| 976                                   | 7,645           | 2.80                        |                             |
|                                       | 11,117          | 1.97                        |                             |
|                                       | 2,828           | 6.69                        |                             |
|                                       | 2,899           | 4.925                       |                             |
| Mathematical average,                 | 3.124           |                             | Machine-sample of mix, 3.12 |
| 669                                   | 18,005          | 1.83                        |                             |
|                                       | 22,534          | 1.48                        |                             |
| Mathematical average,                 | 1.07            |                             | Machine-sample of mix, 1.62 |
| 791                                   | 8,254           | 4.93                        |                             |
|                                       | 10,130          | 2.38                        |                             |
|                                       | 8,346           | 2.08                        |                             |
| Mathematical average,                 | 3.073           |                             | Machine-sample of mix, 3.12 |



TABLE X.—*Sampling-Results, Copeland Sampling Co., Victor, Colo.*

Using Oscillating Time-Samplers.

| Cripple Creek Gold-Ore | First Sample.            | Resample                 |
|------------------------|--------------------------|--------------------------|
| Lot No.                | Gold.<br>Ounces per Ton. | Gold.<br>Ounces per Ton. |
| 260                    | 14.065                   | 13.96                    |
| 270                    | 1.01                     | 0.99                     |
| 606                    | 0.56                     | 0.54                     |
| 639                    | 0.59                     | 0.60                     |
| 692                    | 1.28                     | 1.30'                    |
| 757                    | 1.30                     | 1.25                     |

The most convincing tests of correct valuation in ore-sampling are those in which numbers of small lots are bought and paid for individually, and stored for a considerable time, until a sufficient quantity of ore has been collected to form one large lot. When this period arrives the individual lots are not mixed, but run through the mill in succession, and it is usually found that the mechanical sample of the mixture agrees with the calculated average as determined by the values in the original purchases as closely as the best control-assays.

The small lots when originally received, sampled, and purchased were coarse and generally wet, but when run through the mill the second time they are both fine and dry, giving thereby the greatest possible dissimilarity in conditions of size of particles and moisture-content. The excellent checks obtained on this class of work show conclusively that with "time-sampling" the results obtained are in no way affected by the physical conditions of the ore, and may be implicitly accepted as correct.

The art of sampling has now reached a stage where a standardization of methods is both desirable and possible, and it is to be hoped that the Mining Congress, or the proposed Bureau of Mines, will take the matter under consideration and appoint a thoroughly qualified commission which will give the subject the study and investigation its importance demands. Recommendations by an unbiased, competent board would do much to eliminate faulty methods, and bring about the adoption of standard systems of valuation which would prove of inestimable benefit to the mining and metallurgical industries from both a business and a scientific standpoint.

#### AGALMATOLITE—PSEUDO TALC.

On the south shore of Conception Bay, some ten miles from St. John's city, is a small settlement named Manuels, and three or four miles inland from this a quarry has been opened on a mountain for the working of outcroppings a deposit of substance sometimes referred to as talc. Properly speaking this terminology is incorrect seeing that the deposit referred to is silicate of alumina and potash with little or no magnesia. In fact it more nearly approaches in composition a material known as agalmatolite the figure-stone of the Chinese. The deposits extend over a big area forming the great bulk of two mountains and must contain some millions of tons. The concern operating this deposit is known as the North American Talc Co. They have had an overhead tramway constructed from the mine to the railway, a distance of about two miles. Their pier is at Seat Cove, some ten miles further up the bay, this being the nearest safe harbor for shipping. In 1905 they shipped about two thousand tons to Portland, Me., where the company have a large establishment for grinding the material and converting it into marketable condition.

Samples of the material were shipped to Messrs. Little & Walker analysts, of Boston, who reported as follows: "We find this to consist essentially of a silicate of alumina, containing only 0.05 per cent. iron oxide. This material is unique among those suggested for use as paper fillers in that it closely resembles clay while having the smoothness and other desirable physical properties of talc. We have examined your samples critically with reference to their use as a filler for paper. We consider the colour of the material unusually good, even remarkably good. It is very clean, has a particularly good feel, and is entirely free from mica. In view of these facts and the exceptionally good feel of the material, we feel justified in saying that in our opinion you have produced in the samples submitted to us an exceptionally good filler for the better grades of paper, and one which combines in a unique way the good properties of both talc and clay. The analysis resulted as follows:

|                        |       |
|------------------------|-------|
| Silica .....           | 53.11 |
| Oxide of Alumina ..... | 40.22 |
| Iron .....             | .29   |
| Lime .....             | .69   |
| Magnesia .....         | .90   |
| Loss of ignition ..... | 4.72  |
| Moisture .....         | .07   |
| Alkalis .....          | Trace |

Experiments were also made with the substance as a filler for paper and a summary of the result of the mill test follows. Two lots of paper were made, one loaded with clay and the other with the Newfoundland "talc." The paper with the "talc" gave 22 per cent. ash and retention 77.5 per cent.; that with the clay, 16 per cent. ash and 72 per cent. retention. On the whole the "talc" seemed to work about the same as the clay, the finish with it being, if anything, a little better. The sample lot was also tried for coating and gave satisfactory results, the paper appearing to calender quite easily.

As this material is said to be of great industrial importance in the manufacture of porcelain, china and other wares, as well as possessing many of the desirable qualities of talc, it would appear that when fully developed this area is likely to prove of value.

**A Dictionary of Chemical and Metallurgical Material**, a neat paper-bound pamphlet, has been published by the Electrochemical and Metallurgical Industry, New York. Part I. is a list of machinery, appliances and material used in the chemical and metallurgical industries, with the names and addresses of the manufacturers. Part II. gives an alphabetical list of measuring instruments and laboratory supplies, also manufacturers' addresses in each case. Part III. is a professional directory. The price, 50 cents, is modest. The booklet is well worth having.

The tailings from the St. Eugene concentrator, Moyie, B.C., are being used as ballast by the Canadian Pacific. Four hundred tons per day is the amount of this product accumulating at the mill.

German colliery companies have adopted, almost unanimously, the system of quarterly dividend payments.



# THE MAPLE MOUNTAIN MINING DISTRICT OF ONTARIO.

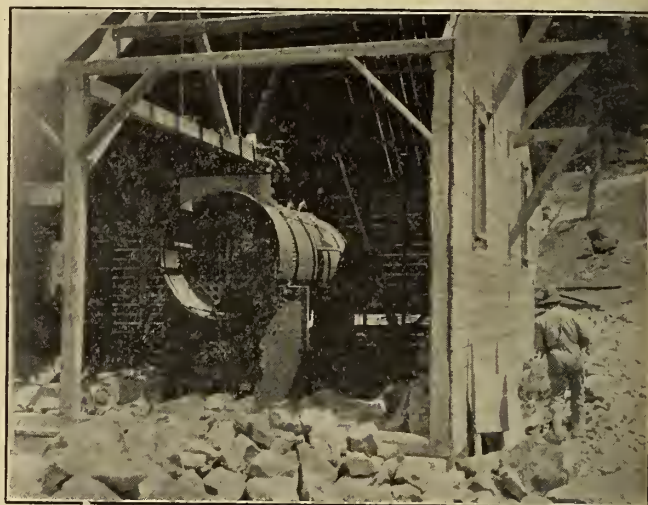
By J. D. Ramsay.\*

Amid all the excitement and noise of successive booms in Elk Lake, Miller Lake, Gowganda and elsewhere, one district has quietly and persistently, without outside assistance or newspaper advertisement, gone ahead until it has asserted its right to be looked upon as one of the most promising silver mining regions outside of Cobalt. This is the Maple Mountain District, situated in the Township of Whitson, Van Nostrand and Speaight, in the Temagami Forest Reserve, and extending northwards from Anvil Lake for a distance of about nine miles. It is flanked on the west by the high ridge of Maple Mountain, which forms a kind of "Hog's Back" parallel to the diabase outcrop. The district is excellently illustrated in the geological map of the Montreal River district, published by the Mines Department.

It is not altogether easy, in view of the good surface showings from many different properties in the district, to understand why prospectors and others should have overlooked it, and rushed in to much less accessible regions, such as Miller Lake and Gowganda, to say nothing of Shining Tree Lake. A glance at the aforementioned map will show that the southern end of the region can be reached, at Anvil Lake, by no more than five portages, the longest of which is only three-quarters of a mile long, while the rest are "just a jump." However, this summer has witnessed a certain revulsion of feeling among many prospectors and the district is now receiving a little more of the notice which it deserves.

Leaving the River Steamer at Mowat's Landing, a short paddle brings the traveller to Mattawapika Falls, a distant view of which is familiar to those who have been up the Montreal River. Here the first portage, a short one, is encountered; but the tedium of

surrounded mainly by muskeg; and this in its turn gives place to Lady Evelyn Lake at the "Narrows," where the lake contracts for half a mile or so between high bluffs of sandstone and quartzite of Lower Huronian age. On emerging from the narrows, the course leads up the north-west arm of the Lake and round



BOILER ON WHITE RESERVE MINE.

Sucker Gut to the portage to Emily Lake, which is just below Willow Island Falls; this portage is three-quarters of a mile long, and very rough; and the writer hopes that none of his readers may have a similar experience to one, which in company with two companions, he recently fell a martyr to, when he had to make it during a total eclipse of the moon. This is however the only bad portage; and a convenient creek and chain of small lakes lead northwards from Emily Lake to Anvil Lake, on whose western shore the diabase ridge may be said to commence.

Like all the occurrences of this rock in northern Ontario this diabase is a laccolite of fair thickness which appears to have been forced up from below Maple Mountain. The outcrop shows unmistakable escarpment on the east, and a dip slope of about 26° to the west, and runs almost due north and south. From Anvil Lake to Duncan Lake, it forms two high ridges, 200 to 300 feet above the sandy plain lying to the east, and the base of Maple Mountain to the west, these ridges forming a striking feature in the landscape. From conversations with prospectors and others, the writer gathers that this laccolite is probably the same as that found on Lost Bear Lake to the west where it occurs dipping to the east in the direction of Maple Mountain. The latter probably owes its origin to this upheaval.

The diabase presents the usual features; it varies in texture from fine grained diabase to coarse gabbro and in composition from ultra-basic almost to acid-intermediate; in one place on the property of the White Reserve Mines Limited it has all the appearances of syenite.

The veins are markedly parallel, running due east and west across the outcrop, and can in some cases be



ROCK DRILL IN CUTTING, WHITE MINE.

packing canoe and kit is amply made up for by the beauty of the falls, and of the succeeding stretch of river above them. Mattawapika River gives place to Mattawapika Lake, a broad and shallow sheet of water

\*Mining Engineer, Traders Bank Building, Toronto.

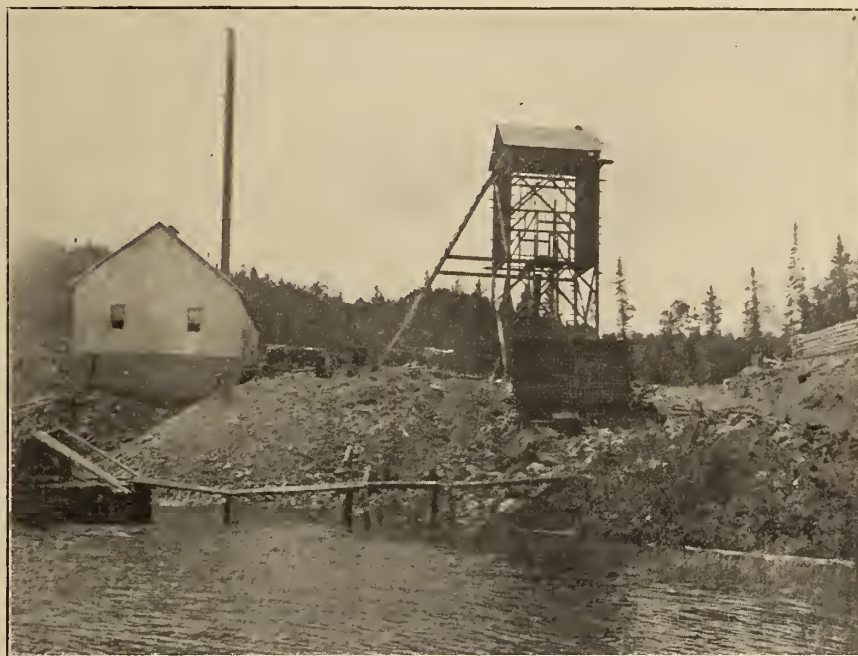


traced on the surface clear from one side to the other, a distance of a quarter of a mile and upwards. They are of frequent occurrence, and almost invariably show signs of mineral, while from some, high grade ore has been mined and sacked. Alpite veins, so called, are not frequent, but there are many strong leads of smaltite; and in some cases, a kind of impure asbestos is found. Many of the veins take the form of lenses of fine grained diabase enclosed within walls of comparatively coarse grained rock, amounting almost to a gabbro; and on one or other of the faces, lie the smal-

one 80 ounces, the other 90 ounces, per ton. This may be said to be one of the most pleasing features of the district, indicating that a large body of low grade milling ore may be expected.

All the rock is highly mineralized and very magnetic, a compass survey being impossible. Practically every vein shows cobalt bloom, and frequently the mixed bloom of cobalt and nickel; but chalcopyrite is not of such frequent occurrence as in some other parts of the Montreal River district, notably Bloom Lake.

As mentioned previously this region has never had



SHAFT AND POWER HOUSE, WHITE RESERVE MINE.

tite and associated minerals. The walls are so clean, and the natures of the vein rock and country so different in many cases, that it is hard to reconcile this particular mode of occurrence with the now generally accepted theory that the veins in diabase owe their origin to magmatic segregation. Veins having this structure have usually proved the richest in this district, since, in addition to the actual small lead carrying silver, the fine diabase of the lens is often impregnated with leaf silver; and two samples carefully taken which showed no visible metallic silver at all assayed,

a boom; perhaps for that very reason it is better off; for those who have claims in it have been content to do honest work and to prospect the area thoroughly, instead of promoting "Wild Cats" and shaking the confidence of the mining investor yet once more.

The photographs accompanying this article will demonstrate much more clearly than oceans of ink and reams of paper, that mining in this little-heard-of district is being carried on upon legitimate lines, and not with the view of filling the pockets of the company promoter.

## GENESIS AND DEVELOPMENT OF THE COKING OVEN\*

By W. Galloway.

The preparation of coke from pit coal appears to have been practised for at least 250 years. It was probably first begun owing to the increasing difficulty of procuring supplies of timber for making charcoal for metallurgical, malting, and other purposes in which the more easily obtainable and therefore cheaper coke was substituted for the more expensive charcoal. To commence with, and for many years afterwards, in fact far

\*From paper read before the South Wales Institute of Engineers.

into the last century, coke was for the most part made in exactly the same way as charcoal.

Large coal was stacked in circular or oblong piles in the open, partially or wholly covered over with a wet layer of fine coke-dust and with certain channels for the passage of air formed in them just above the level of the ground, and extending from their periphery to one or more vertical chimneys or holes in their centre. The circular piles were from 15 to 20 feet in diameter and 3 to 3½ feet high; the oblong piles 12 to 18 feet wide, 3 to 3½ feet high, and 30 to 50 feet long. The



ends of the air channels next to the periphery were sometimes formed with inverted cast-iron troughs with holes in them; their ends next to the chimneys with the largest blocks of coal, and their intermediate parts with "dry" bricks.

The chimneys had cast-iron lids with handles for closing them air-tight when required. Ignition was effected at the bottom of the chimneys, or vertical holes, by dropping burning coal and pieces of wood down through them; and the fire gradually spread from the centre towards the periphery, or in the opposite direction to the air-currents. Care was taken to keep the mantle of damp coke-dust as air-tight as possible while this was going on, and when smoke ceased to issue from the chimneys or holes all openings were sealed up and the heaps allowed to cool.

Ovens for coking are first mentioned in the latter half of the eighteenth century. In 1773 Horne and in 1782 the Earl of Dundonald obtained patents for the recovery of the by-products obtainable from coal coked in closed vessels or chambers. The Dundonald patent provided for the admission of a restricted and regulated supply of air to the interior of the chamber for the purpose of creating sufficient heat to carry on the process of distillation by the partial combustion of the gases. From that time forward, ovens worked upon the Dundonald principle (but, except in rare cases, without arrangements for the recovery of the by-products) have been in constant use. The more ancient ovens were circular, elliptical, or ovoid in plan, with a dome or cupola for a roof, the more recent, square or trapezoidal, with a cylindrical arch for a roof.

One of the former was provided with an air passage, which entered the masonry on each side of the doorway, passed all round about the chamber, and was connected with its interior by branches; a circular outlet for the products of combustion, which was probably also used for introducing part of the charge; and a cast-iron door. Its vertical walls were from  $2\frac{1}{2}$  to  $3\frac{1}{2}$  feet high, in some cases more; and its diameter or other dimensions varied from those required to accommodate a charge of  $1\frac{1}{2}$  tons up to those required for several tons.

Each oven was provided with a doorway at one side or one end, with an outlet for the gases in the top, and with one or more inlets for air. The charge was introduced through the doorway, or partly through the doorway, partly through a hole in the roof, and both of these openings were afterwards more or less completely closed.

The escaping gases passed into a short chimney and thence into the atmosphere. Circular ovens of this class, known as Beehive, have persisted up to the present day. The coke was drawn out through the doorway by means of a long iron rod bent into the form of a ring at one end to serve as a handle, and at right angles to itself at the other to serve as a hook.

The time required for coking varied from 48 to 72 hours, according to the magnitude of the charge; and the yield of coke varied from 50 to 65 per cent., according to the quality of coal and other circumstances. Many of these ovens produced a very fine, much-prized quality of coke. After a charge had been drawn out, the walls, as a rule, retained sufficient heat to ignite the following charge.

The work of drawing the hot coke out through a narrow doorway, in an oven of any shape whose diameter, or width, is greater than that of the doorway, is, as can be imagined, a most laborious and exhausting operation. This consideration led to the construction

of rectangular ovens of greater length than width, with a doorway of the full width of the oven at one end, and later, as will be seen further on, with a doorway at each end. When ovens of this shape with a doorway at one end—some of which are still in use—are about to be charged, an iron frame—frequently made of two pieces of old permanent-way rail, one as long, the other nearly as wide, as the oven, one end of the longer bar fixed at right angles to the middle of the shorter bar, and its other end provided with a strong link—is pushed in along the floor until the cross-bar touches the back wall.

The charge is then introduced and coked in the ordinary way. When the coke is ready to be drawn out, the door is removed, the charge is cooled with water inside the oven, a hook, at the end of a chain which extends from a windlass at the opposite side of the coke-bank, is passed through the link at the outer end of the long bar, and the charge is drawn out on to the coke-bank in one block. With long rectangular or trapezoidal ovens, which have a door at each end, the charge is pushed out by means of a ram with a shield at one end, and cooled with water, partly as it emerges from the oven, partly after it has fallen in pieces on the coke-bank.

Up to the year 1840 no attempt appears to have been made to apply heat generated by the combustion of the gases to the outside of the oven walls, with the object of coking the charge in its interior. At that date Cox obtained a patent for an oblong rectangular oven, with two cylindrical arches over the coking chamber, one above the other, with an empty space between them. The lower arch extended from the back to near the front, where it terminated, leaving a communicating passage between the space below it and the space above it, and air was admitted through holes in the back walls into the space between it and the top of the charge.

The products of combustion thus passed from back to front under the lower arch, then up into the space between the two arches, then back over the lower arch into the flue, and so up the chimney. This appears to have been the first attempt made to increase the heat of the chamber by circulating the hot gases on the outer side of one of its walls.

It would be difficult to trace the exact course of events during the next twenty years, but the following extract, translated from the writings of a contemporary writer, will serve the purpose of throwing some light upon it.

Writing in 1858, Hartmann says: "Improvements in the process of coking have, during recent years, been the object of many experiments and investigations, in Belgium and Rheinland, which are not yet terminated. . . . The object of these improvements has been to produce better coke, to reduce the time required in coking it, and to obtain a better yield, so as to be able to compete with English coke, which is made of the best materials, and is of exceptionally good quality.

"In the whole of these investigations one principle whose practical application has been sought for in many different ways, has been steadily kept in view—namely, to employ the waste heat in order to effect the distillation of the charge. . . . It stands to reason that this object can be effected only by means of more or less complicated apparatus.

"In all these improvements the main problem has been to prevent the consumption of coal through contact with air outside the oven, and to subject every part of the oven to a uniform temperature. . . . This objec



was sought to be obtained in Belgium by the construction of ovens of very small dimensions, and by associating a number of ovens together in one system, in which the waste heat of one oven could be employed in heating the coal newly charged into another oven. . . . This was effected by conducting the gases through flues below and in the side walls of the ovens, and extracting as much heat from them as possible before allowing them to escape into the air.

"It must be remarked in this place that the actual combustion of the gases was not contemplated, except in the case of a few ovens. At first, apparently, the contact of the hot gases with the walls of the ovens was all that was thought of, although it is obviously in the combustion of these gases that their greatest heating power lies; and in the case of most ovens even now without this being the intention of their constructors, combustion takes place by the leakage of air through the open joints of the brickwork at the ends of the horizontal flues. . . . The Talbot and Dulait ovens constitute an exception to this rule, as provision is made in both for the complete combustion of the gases.

"The construction of the flues in detail can naturally be carried out in many different ways; for instance, ovens have been placed one above the other, one alongside the other, or end to end, or two or three ovens, or a whole row, have been built in a range and so on.

"This principle was obviously carried too far in Belgium, as is best illustrated by the greater simplicity recently introduced in the suppression of many of the flues whose useful effect upon the ovens did not appear to compensate for their great cost.

"Nevertheless, heating the floor and side walls of the ovens by means of the waste heat must continue to be the guiding principle in all cases."

After expressing himself thus, Hartmann proceeds to compare the results of coking coal in the newer with that of coking it in the older ovens, and draws the conclusion that the newer ovens are really cheaper in first cost than the older ones, since they occupy less space and yield a greater quantity of coke than is necessary to compensate for their higher first cost.

During the years of experiment and investigation spoken of by Hartmann, the retort-oven proper was thus evolved and brought into active use, and all the improvements that have been added to it since then have been simply modifications in its structure and dimensions.

Writing in 1846, Scheerer described certain coking ovens in use at that time at some of the ironworks in Germany (Gleiwitz in particular), from which the volatile products were led away in pipes to condensers for the purpose of recovering a certain quantity of tar from them, which could be usefully employed on the spot.

Each oven stood alone, was cylindrical to about two-thirds of its height, and was covered in by a hemispherical dome. It had a doorway on one side, extending from the floor to about one-half of its internal height; a second circular opening in the dome, of a little less than one-half its diameter; an outlet pipe say 9 inches in diameter, extending horizontally through its walls from the apex of the dome on the side opposite to the door, to the condenser; five rows of holes equally spaced radially round about its periphery, all the holes of each row being in the same horizontal plane, the lowest row close to the floor, the highest row near the apex of the dome, and the intermediate rows spaced equally between the highest and the lowest; and lastly, some similar holes in its floor, communicating with a space excavated

for this purpose below the latter, into which air could be drawn from the outside. Each of the holes in the sides and floor was formed by building a cast-iron pipe of 1½ inch internal diameter in the masonry.

The oven was charged, partly through the doorway, partly through the opening in the dome, with 35 to 40 cwt. of large coal. The largest pieces were placed next the floor and built together in such a manner as to enclose a hollow space into which fire could be introduced from the doorway. The charge extended up to the lower side of the outlet pipe, and thus almost completely filled the oven. After the charge had been introduced the doorway was then built up with masonry to the level of the kindling hole, all the radial holes except those of the lowest row were closed with well fitting plugs, and a cast-iron door was placed on the hole in the dome and made air-tight. Soon after lighting the charge the upper part of the doorway was built up and luted with clay.

When the coal opposite the lowest row of holes showed an orange-coloured glow, that row was plugged and the next higher one opened, and so on with the others. About 36 or 40 hours after ignition the time had arrived to plug the highest row. Then the oven was allowed to cool for 12 hours, the door was pulled down, and the coke drawn out and extinguished with water. The yield of coke is said to have been 53 per cent, but the quantity of tar obtained is not mentioned. This oven appears to have been a modification of Lord Dundonald's, and it would therefore be interesting to know whether it was in reality a survival from the closing years of the eighteenth century, when the patent for its use was granted.

In 1862 Pernolet obtained a patent for an oven which he described as intended to "utilize the products of distillation of coal so as to reduce the price of coke," and in 1864 he read a paper on the subject before the Institution of Civil Engineers. It was a beehive oven into which no air was admitted; the heat was applied only underneath its floor; the volatile products were conducted in pipes to condensers and scrubbers, in which the tarry matters and ammonia were separated from the permanent gases; the latter could then either be used for lighting purposes or returned to the ovens and burnt in the flues beneath them—or partly one, partly the other. The quantity of gas thus obtained was obviously thought or found by experience, to be insufficient to generate all the heat required, for each oven was provided, in addition, with a furnace and fire-bars underneath its floor, on which coke breeze, waste coke, and, if necessary, small coal, could be burned so as to supply the deficiency. Pernolet claimed that his ovens gave the following results:—

|            | Per cent. |
|------------|-----------|
| Coke ..... | 69.3      |
| Tar .....  | 3.0       |

Sulphate of ammonia (10 lb. per ton of coal) . . . . 0.44

Mr. A. L. Stevenson (vide Transactions of the North of England Institute of Mining and Mechanical Engineers), who employed 36 Pernolet ovens in the North of England for a number of years, and experimented with various modifications of ovens of the Pernolet type, says he found that the beehive shape, 11 feet in diameter, gave the best results, namely:—

|                                                  | Per cent. |
|--------------------------------------------------|-----------|
| Coke .....                                       | 68        |
| Tar .....                                        | 2.40      |
| Sulphate of ammonia (4.14 lb. per ton of coal) . | 0.185     |



He remarks further that the coal was soft and the expense of repairs great, and that, as a consequence, the system was abandoned. He also states that he examined 120 Pernolet ovens employed at the Wigan Coal and Iron Company's works, and that they appeared to give somewhat better results than his own. A good many Pernolet ovens are said to have been erected on the Continent.

Enough has been said to show the genesis of the modern coking oven, including its use as a retort and hence as a source of liquid by-products and gas; it would therefore serve no particular purpose, however interesting it might be from an historical point of view, to minutely describe the process of coking on circular and oblong heaps or piles. The Schaumburg kiln, Smet's, Appolt's, Talbot's, E. Jones's, and many other ovens now passed into oblivion, some of which have contributed one or more of the details of construction and methods of working embodied in modern practice. The long, narrow, high retort-oven, heated by the combustion of gas in its flues; the method of charging through holes in the top; the door constructed of fire-bricks held together in an iron frame, and raised and lowered by means of a chain; the ram for discharging the coke; the employment of waste gases under steam boilers; and the condensation and collection of liquid by-products were all in operation before the year 1860; and the last link in the chain—Pernolet's system of returning the non-condensable gases to the ovens, with the object of burning them in the flues beneath their floors, and thereby coking, or assisting to coke, the charge—was patented in 1862.

During the years that have elapsed since 1862 much skill and ingenuity have been exercised in perfecting the details of the modern coking oven, which is now gradually eliminating all its more ancient rivals from the field. The success of these efforts is best illustrated by the fact that in the most recent type of ovens the economy of heat is so great that after the tar and ammonia have been extracted only one-half of the permanent gas is required to coke the coal, and the other half is available for steam-raising or for use in gas engines. The yield of these ovens per ton of coal coked is given by Mr. Hann as follows:—

|                                       | Per cent. |
|---------------------------------------|-----------|
| Coke .....                            | 80        |
| Breeze .....                          | 1.75      |
| Tar .....                             | 1.63      |
| Sulphate of ammonia (19.5 lbs.) ..... | 0.87      |

### WESTERN COPPER COMPANY'S MINES, NEW-FOUNDLAND.

By H. V. Smythe, Mgr. Western Copper Co.

The mines of the Western Copper Company are situated at York Harbor, bay of Islands, on the west coast of Newfoundland. The harbor is safe and ample, about six miles in length by three in breadth, and is surrounded by very high land, except at its head, where there is a wide and level stretch of country reaching inland. A large island, Governor's Island, lies in the centre of the harbor, and affords complete shelter to shipping of any size.

The hills on the eastern side of the harbor, where the Western Copper Company's mine is situated, rise abruptly from the waterside, and attain an elevation of 2,125 feet at a little distance inland in what is

known as the Blow-me-down Mountains. The western slope has several minor ridges or foothills, intersected by ravines, through which brooks of considerable size flow out into York Harbor.

The mine is located at the head of what is known as Eagle Nest Brook, is about three-quarters of a mile from the shipping, and is at an elevation of about 1,000 feet above tidewater. The geological structure of this district is similar to that of Notre Dame Bay, which has proved a profitable copper-producing district. The rocks consist of the metamorphic metalliferous zone of eastern North America. Wherever this series occurs in Newfoundland it has proved highly metalliferous, all the copper deposits of Notre Dame or White Bays being in the same series. The copper-bearing rock forming the ore channels is a dark green to black serpentine being an altered diorite, which is the common or country rock. The serpentine band is of unknown width, and contains superimposed, lenticular masses of low-grade chalcopyrite. These ore-masses vary in size being found crushed or broken near the surface and in solid masses of many thousands of tons as depth is attained. The ore is compact and close-grained, containing about 4.5 per cent. copper and 38 to 41 per cent. sulphur. It is in demand in both Europe and the United States as a fluxing medium, the sulphur being extracted and used in the manufacture of sulphuric acid.

The general trend of the ore-bearing serpentine belt is northeast and southwest with a dip of about 72 degrees southeast, the ore-masses practically conforming to the same trend and dip.

The Western Copper Company's mine is 360 feet in depth. It has three shafts, one of which, the main, is used for hoisting, the other two for pumping and ventilating purposes only. The main shaft is sunk at an angle of 72 degrees southeast, or practically the dip of the ore lenses. At every 60 feet levels have been driven to the southwest along the strike of the ore bodies, and where they occur mining has been carried on by means of overhead stopes. As these stopes average from 10 to 30 feet in width, heavy 12 x 12 inch timbers are used in "square sets" to support the back or roof where the ore has been removed.

At present the company is not actively mining the property, but are locating and developing new ore bodies shipping what is taken out during development. They have now between 30,000 and 40,000 tons of ore in sight added to which another series of lenses is being opened up of sufficient depth to more than double that amount.

The plant is well equipped with machinery for both mining and transportation, and there are good shipping facilities. Air drills are used, compressed air being supplied by a Norwalk high-altitude compressor. The ore is hoisted from the mine in an automatic self-dumping skip of one ton capacity by means of a 50 hp. Flory hoist. The ore goes through a crusher, which reduces it to size that will pass through a ring of 6 inches diameter. From the crusher it passes to cars on the main tramway, and these are then lowered to the main tramway by means of powerful winding engines.

The tramway is 5,400 feet in length, dipping 1,000 feet in that distance. The track is 3 foot gauge, and the train consists of two steel self-dumping cars carrying tons each. These cars shoot the ore into a pocket, the capacity of which is 2,000 tons. Underneath the pocket is a double-tracked tunnel, both sides of which are fitted with shute gates. This tunnel connects with the superstructure of the pier, over which cars carrying one to each are pushed and tipped into the hold of the steamer.



By means of this apparatus about 700 tons of ore per day can be loaded into the hold of the steamer.

Besides the property described, the Western Copper Co. has two adjoining areas both having extensive surface indications of copper. To the west and adjoining this

property an English and Canadian syndicate have taken up several square miles, and are engaged in prospecting. The results have been satisfactory, and warrant the expenditure of a considerable amount of money on its further development.

## THE ACTION OF ORGANIC SULPHUR IN COAL DURING THE COKING PROCESS.

By A. L. McCallum, B. Sc., Halifax. Read 12th February, 1908.

I was led to undertake this investigation by the conflicting statements of the authorities as to the action of organic sulphur during the coking process. Some say that the whole of the organic sulphur remains in the coke, others that part is volatilized, and still others that all the organic sulphur is driven off in the coking process. It is barely possible that all these statements are true of different coals, but I wanted, if possible, to find out what was the case with a typical Nova Scotia coking coal.

It occurred to me that if I could get a series of samples with a decreasing amount of inorganic sulphur and an increasing amount of organic, I would be able to get some data on the above subject, by determining the amount of inorganic and organic sulphur, and at the same time the amounts of volatile and fixed sulphur in the various samples.

It might be well at this point to say a few words as to the manner in which sulphur occurs in coal. To the best of our knowledge sulphur occurs in three forms in coal:—(1) as sulphates; (2) as iron pyrites; (3) as organic sulphur.

The coal used in this investigation was practically free from sulphates so that we have the two latter forms only to deal with.

The action of iron pyrites when subjected to heat without access of air is well known. There is loss of one atom of sulphur according to the equation  $\text{Fe S}_2 = \text{Fe S} + \text{S}$ . The coke oven presents ample time and the necessary conditions for this reaction to be complete.

Not knowing in what state of combination the organic sulphur occurs in coal, it is impossible to say what effect the heat of the coke oven will have. It was, as previously stated, in an attempt to throw some light on this question, that the investigation was undertaken.

Now to return to our coal samples. The only way to obtain such a series of samples as previously mentioned, viz.: with decreasing inorganic and increasing organic sulphur was to fractionate the coal on the basis of specific gravity, that is to separate it into several fractions of gradually decreasing specific gravity. The means used to accomplish this were solutions of calcium chloride of varying specific gravities. The coal used was crushed to pass through 1-12 inch mesh screen and was then placed in a vessel containing a solution of calcium chloride of slightly higher specific gravity than that of coal.

For instance, the raw coal was found to have a specific gravity of 1.323. For this a calcium chloride

solution of 1.35 specific gravity was used. This separated the coal into two fractions having the following specific gravities: the lighter material 1.275, and the heavier 1.731.

Part of this lighter or floating fraction was reserved for analysis and the remainder was treated with a calcium chloride solution of lower specific gravity. This procedure was kept up until, at a specific gravity of 1.24, there was no floating fraction.

Between these two extremes I obtained five fractions of the following respective specific gravities:

|             |       |
|-------------|-------|
| No. 1 ..... | 1.323 |
| No. 2 ..... | 1.275 |
| No. 3 ..... | 1.261 |
| No. 4 ..... | 1.253 |
| No. 5 ..... | 1.243 |

The proximate analyses of these samples are as follows:—

TABLE I.

| No.    | Volatile matter. | Fixed Carbon. | Ash. | Sulphur. | Sulphur in Coke. |
|--------|------------------|---------------|------|----------|------------------|
| 1..... | 35.10            | 59.74         | 5.16 | 2.06     | 1.80             |
| 2..... | 35.92            | 61.57         | 2.51 | 1.29     | 1.17             |
| 3..... | 36.10            | 62.27         | 1.63 | 1.09     | .85              |
| 4..... | 37.47            | 61.50         | 1.03 | .95      | .78              |
| 5..... | 37.75            | 61.35         | .90  | .88      | .68              |

The only method at present available for the determination of the organic sulphur in coal is by difference, and there is one inherent source of error which, however, I think is not material. The method referred to is as follows:—The percentage of iron is determined. Then this iron is combined with the necessary amount of sulphur to form iron pyrites ( $\text{Fe S}_2$ ). This amount of sulphur is deducted from the total amount in the coal and the balance is called organic sulphur.

The error referred to in this method is due to the fact that it is almost certain that there is some iron present as silicate in the "stone and shade" which are always present in the coal. But as the percentage of iron in the "stone and shale" rarely exceeds 3 per cent. and the percentage of stone and shale in the coal under consideration rarely exceeds 5 per cent. of the coal by weight, it will readily be seen that any error introduced will be exceedingly small.

Applying this method to the samples under consideration, we obtain the figures given in the Table II.

TABLE II.

| No.     | Organic sulphur. | Inorganic sulphur |
|---------|------------------|-------------------|
| 1 ..... | 37.86%           | 62.14%            |
| 2 ..... | 56.59%           | 43.41%            |
| 3 ..... | 71.56%           | 28.44%            |
| 4 ..... | 83.16%           | 16.84%            |
| 5 ..... | 85.23%           | 14.77%            |

We have thus clearly obtained a series of samples with gradually decreasing inorganic and increasing organic sulphurs.

There is also another way in which the total sulphur may be distributed, viz.: as volatile and fixed sulphur; meaning of course, that sulphur which escapes during the coking process and that which remains in the coke. The method used in obtaining this information is to first determine the total sulphur in the coal and then the total sulphur in the coke produced from that particular coal. From this it is easy to calculate the amount of sulphur volatilized.

Table III. gives the figures thus obtained.

TABLE III.

| No.     | Volatile sulphur. | Fixed sulphur. |
|---------|-------------------|----------------|
| 1 ..... | 33.49%            | 66.51%         |
| 2 ..... | 42.64%            | 57.36%         |
| 3 ..... | 50.46%            | 49.54%         |
| 4 ..... | 49.47%            | 50.46%         |
| 5 ..... | 52.27%            | 47.73%         |

There is not the same regularity as shown in Table II, but there seems to be an increase in the amount of volatile sulphur in those samples having a high percentage of organic sulphur.

Now if the only sulphur volatilized was the one atom of sulphur in pyrites according to the above mentioned equation, we can calculate what the percentage of volatile sulphur should be; because the sulphur called inorganic is assumed to be present as iron pyrites. So that if we take half the inorganic sulphur it should correspond with the percentage of volatile sulphur if the above supposition is true, and also if there is no organic sulphur volatilized.

The result of this calculation is given in Table IV.

| No.     | One half the Inorganic sulphur. | Volatize sulphur | Difference. |
|---------|---------------------------------|------------------|-------------|
| 1 ..... | 31.07                           | 33.49            | 2.42        |
| 2 ..... | 21.70                           | 42.64            | 20.94       |
| 3 ..... | 14.22                           | 50.46            | 36.24       |
| 4 ..... | 8.42                            | 49.47            | 41.05       |
| 5 ..... | 7.38                            | 52.27            | 44.89       |

This would seem to indicate that when the inorganic sulphur was in excess the above supposition is approximately true, but that it does not hold at all when the organic is in excess. It seems rather strange why this should be so unless it is due to mass action.

I think we are perfectly justified in concluding that in the coking process a very considerable part of the organic sulphur is volatilized.

In 1907 Canada exported 7,419 tons of coal to the Hawaiian Islands. During 1908 only 1,548 tons were exported.

## COAL-CUTTING MACHINES.

Mr. R. D. Bain, the Chief Inspector of Mines in the Durham District, England, states that there is an increase of 23 coal-cutting machines as compared with the previous year, the total now being 175 for the district. Both electricity and compressed air are used, but the larger number use compressed air, as it is more easily handled, assists ventilation and is less liable to accidents in fiery mines, but the leakage is greater when working at a long distance from the face. With the eight-hour day established I anticipate a much larger use of coal-cutting machinery in collieries, as all labour-saving devices must be used to enable British coal-owners to compete with Continental mines, where labour is cheaper and the hours worked greater than in this country. It has been found in Rand experience that the loss of air is less when it is transmitted in large piping, the pressure being much heavier when small pipes are used, and this factor should not be lost sight of in the utilization of compressed air in collieries.

It has also been found that when the coal seams and other conditions are favourable, the output per man may be doubled when machines are used, while the cost of production is appreciably reduced and an increased value of the output per ton is obtained, the proportion of round coal being increased with machines by 25 per cent. Besides, the coal mined is firmer and in better condition, and a more regular line of face is obtained by machines, and fewer explosives are required in breaking down the coal.

Although coal-cutting machines were introduced in Great Britain 50 years ago, in 1902 there were only 166 machines used, while in 1907 there were 1,493 machines in use. In the United States of America there were 10,212 machines in use in 1906, and the percentage of the total coal mined by machinery was more than 30 per cent. Each machine used in the United States showed an average annual production of 11,638 tons, as compared with 8,630 tons in Great Britain. In the United States the total number employed in coal mines was 940,618 persons; in Great Britain a total of 1,059,028 persons were employed in the industry. With fewer men the United States produced 60 per cent. more coal than was produced in Great Britain, largely due to the more extensive use of coal-cutting machines and the larger output of coal per machine.

## NEW MEMBERS—C.M.I.

The following gentlemen were elected to membership at a Council Meeting held on July 15th, 1909.

### Members.

Anderson, Glenn, Mgr. King Edward Mine, Cobalt, Ont.  
 Bailey, Frank, Merritt, Nicola Valley, B.C.  
 Brown, H. L., Mgr. Silver Cross Mine, Giroux Lake Ont.  
 Burnett, A., B. C. Copper Co., Greenwood, B.C.  
 Cameron, John A., Nugget Mine, Giroux Lake, Ont.  
 Chipman, K. G., Geological Survey, Ottawa, Ont.  
 Colvocaresses, G. M., Mgr. Blackburn Mine, Box 607 Gow Ganda, Ont.  
 Dickerman, Allan G., 60 State St., Boston, Mass., U.S.A.  
 Fournier, A., Mgr. Selkirk Mining Co., Ltd., Box 474 Kaslo, B.C.  
 Graham, Chas., Box 269, Nanaimo, B.C.  
 Gray, F. W., Box 225, Sydney, N. S.  
 Groch, Frank, Box 780, Cobalt, Ont.



Groch, Nicholas, C., Box 780, Cobalt, Ont.  
 Hamilton, W. L., Mgr. Leitch Collieries, Ltd., Passburg, Alta.  
 Hinton, R. W., Nelson Iron Works, Nelson, B.C.  
 Little, B. P., Box 1439, Vancouver, B. C.  
 MacMillan, John H., Mgr. Royal Collieries, Lethbridge, Alta.  
 McLaren, Geo. R., Box 247, Perth, Ont.  
 Mavor, Sam, 47 King St., Bridgeton, Glasgow, Scotland.  
 Meek, H. C., Supt. Crean Hill Mine, Crean Hill, Ont.  
 Muller, Alfred, Canadian American Coal and Coke Co., Frank, Alta.  
 Neilly, B., Silver Queen Mine, Cobalt, Ont.  
 Oliver, Chas. E., Dominion Mine Corporation, Hedley, B. C.  
 Ramsay, J. D. 1305 Trader's Bank Building, Toronto, Ont.  
 Rennie, Jas., Mgr. Casey Cobalt Silver Mining Co., Ltd., Box 88, Cobalt, Ont.  
 Robert, L. P., West Canadian Collieries, Blairmore, Alta.  
 Stilwell, Geo., Mgr. Hewitt Mine, Silvertown, B. C.  
 Stovel, Jas. H., Supt. Cobalt Central Mines, Cobalt, Ont.  
 Taylor, R. F., Supt. Nova Scotia Mine, Cobalt, Ont.  
 Thorne, Stuart M., Supt. Silver Leaf Mining Co., Giroux Lake, Ont.  
 Watson, Chas. E., Mgr. Chambers-Ferland Mining Co., Cobalt, Ont.  
 Whitto, E. P., Mgr. Standard Lethbridge Coal Co., Lethbridge, Alta.  
 Woolsey, Wm. J., Thetford Mines, Que.  
 Wright, Sidney B., Supt. Deloro Mining and Reduction Co., Deloro, Ont.

#### Associates.

Castleman, S. J., Box 1162, Vancouver, B.C.  
 Dempsie, E., Mgr. Maple Leaf Coal Co., Bellevue, Alta.  
 Jemmett, D. L., Mgr. Northern Canada Supply Co., Cobalt, Ont.  
 Richardson, Chas., Box 161, Haileybury, Ont.  
 Skill, Albert, Mining Recorder, Elk Lake, Ont.  
 Smith, A. A., Mgr. Badger Mine, Box 751, Cobalt, Ont.  
 Wheaton, W. A., Mgr. Royal Bank of Canada, Cobalt, Ont.  
 Wilkie, John B., Royal Collieries, Ltd., Lethbridge, Alta.

#### Students.

Campbell, Angus D., c/o O'Brien Mine, Cobalt, Ont.  
 Grant, Russel R., 106 Warren Road, Toronto, Ont.

### THE RAND A GREAT MINING MACHINERY MARKET.

According to the President of the Johannesburg Chamber of Trade, the value of the machinery and stores consumed by the mines and works in the Transvaal during 1908 amounted to almost nine and a-half millions sterling, an increase of £930,000 over 1907. Only about £300,000 was imported direct by the companies, the remainder being obtained through local firms. Practically all the principal manufacturers of mining machinery in the world are represented on the Rand through their agents. The manufacturers are kept in close touch with the consumer. The engineers and managers are regularly informed as to the developments which take place in the design and manufac-

ture of special machinery, tools, &c., and the manufacturers are kept fully advised of the requirements of this important market. This is done to a degree that would be impossible through any other source than that of the manufacturers' own representatives.

Mr. Niven, the President, added:—"It must be remembered that we are living in times of extraordinary and rapid advancement in technical matters, and the mining engineers and managers have neither the time nor the opportunity of closely following these. The local merchant or agent, however, makes it his business to do so; that is one of the reasons for being here, and if no other object were attained than that I have indicated, then I say he has justified his existence as a most important factor in the development of this huge industry. There are, however, other reasons why any change as suggested would not be in the best interests of the mines. Few manufacturers abroad, if any, will undertake to deliver goods in Johannesburg or on the mines, 6,000 miles away. They require payment in full for goods supplied, against bill of lading in London, and will accept no responsibility after shipment has been made. If, on the arrival at destination, as not infrequently happens when orders are sent direct, the goods are not up to specification or are from any reason unsuitable, the mine has no redress, having already paid for them, and the result is trouble, inconvenience, delay and loss. This does not occur where orders are placed locally. The firm here takes good care that their principal supply is exactly what is wanted. They are responsible for delivery in good order on the mines, and up to the time promised; and the mine authorities have someone here on the spot to whom they look for the due fulfilment of the contract. I am sure that the men who control the mining industry, as well as the engineers and managers, would be the first to acknowledge that the position is as I have stated it, and I think we need have no fear that any change in this respect is ever likely to take place."

### MINING IN ATLIN, BRITISH COLUMBIA, 1898-1908.

In the July Quarterly Bulletin of the Canadian Mining Institute, Rosalind Watson Young, of Victoria, B.C., writes interestingly of mining in Atlin.

During the past ten years (1898-1908) about six million dollars has been obtained from streams draining an area of less than fifteen square miles. The Provincial Government levies a tax of two per cent. upon all outputs exceeding two thousand dollars. Each year a great deal of gold passed out of Atlin without being declared for royalty, and without being in any way recorded. Hence the following figures are merely approximations.

Output Atlin Mining Division for years 1898-1908:—

|            |          |
|------------|----------|
| 1898 ..... | \$75,000 |
| 1899 ..... | 800,000  |
| 1900 ..... | 450,000  |
| 1901 ..... | 300,000  |
| 1902 ..... | 400,000  |
| 1903 ..... | 440,000  |
| 1904 ..... | 530,000  |
| 1905 ..... | 475,000  |
| 1906 ..... | 455,000  |
| 1907 ..... | 408,000  |
| 1908 ..... | 200,000  |

Total.....\$4,533,000



This total furnished by the Government is considered too low by Mr. Young, who places it at \$6,000,000. The average number of men employed each year has been about 600. This gives a per capita yield of one thousand dollars.

The small yield recorded in 1908 is attributable to the fact that one of the three largest operating companies did not operate, and the remaining two devoted part of their time to improving their water systems.

Gold was discovered in Atlin first by two partners, Fritz Miller, a German, and Kenneth MacLaren, a Canadian. Six miles from the mouth of Pine Creek they made their discovery. This area has proved the richest in the district. Before autumn, three thousand men had found their way to the camp. It is noteworthy that all the creeks that have been gold producers were staked during this first summer. Only four hundred people wintered in Atlin, but in the following spring there were thousands of new arrivals.

At first there was uncertainty as to whether Atlin was in British Columbia or the Northwest Territories. A placer claim in the latter was 250 feet, and in British Columbia 100 feet. When it was established that Atlin was in British Columbia, the 250-foot claims were "jumped" and abundant material was prepared for years of litigation.

More trouble ensued when, in 1899, the B. C. Government passed an amendment to the Placer Act, excluding all who were not British subjects from holding claims. Although this "Alien Bill" was disallowed within a year, much harm was done. Hundreds of aliens left the camp; experienced miners became scarce, and capital was withdrawn and has ever since been shy.

At first all disputes had to be referred to Victoria; but in 1899 a Special Commissioner was sent to Atlin. Later, a Supreme Court judge visited Atlin each summer, and in 1904 Atlin was made a county for judicial purposes. After the first few years the Gold Commissioner was empowered to adjudicate upon many mining matters.

#### Gold-Bearing Creeks.

Practically all the placer gold of Atlin, except that from McKee Creek, has been derived from the Pine Creek valley, which is a wide valley extending some twenty-five miles eastward of Atlin Lake, and flanked to north and south by low ranges. The valley is drained by Surprise Lake and Pine Creek with their tributaries.

#### Geological Formation.

In 1899 Mr. J. C. Gwillim, then of the Geological Survey, made a log and compass traverse of the lakes, and a paced survey of the surrounding country. In his excellent report he shows that the gold series consists of magnesite, serpentine, pindolite, and actinolite slate. Intrusions of granite cut this series off on the north; to the south are quartzites, slates, and lime-stones. Most of the gold has been found in the gold series, a little in the slates, and almost none in the granite.

Practically no work has been done by the Survey since 1899. Geological investigation of the old water courses would be of great assistance to the miners. There have been several runs of gold; but the richest and most widespread occurs in the "old yellow deposit" of pre-glacial origin. At first, blue gravel was found overlying the yellow; but as work advanced on the benches the blue gravel disappeared, leaving only the yellow. The average value of the gold is twenty dollars an ounce.

#### Relative Value of Creeks.

The leading creeks in order of production, have been Pine, Spruce, and Boulder. In 1899 Pine Creek paid royalties on \$276,564; Spruce Creek, \$45,405; and Boulder, \$48,000. In 1904 the figures were: Pine, \$107,318; Spruce, \$101,557; and Boulder, \$107,906. In 1908 returns showed: Pine, \$46,719; Spruce, \$41,235; Boulder, \$15,200.

From Pine Creek the bulk of the gold has been won by companies; from Spruce Creek by individuals and partnerships.

For the first three years, 1898, 1899, and 1900, ordinary placer methods were employed. Especially for two and a half miles on Spruce Creek, Chinese pumps, water-wheels, drains, ditches, sluice boxes, and wing-dams crowded each other. Pick and shovel worked with good results.

#### Size of Placer Creek Claim.

The 100-foot claims soon proved too small to mine and stack tailings upon. So in 1901 the size of the placer claim was made 250 feet square. In 1906 the Placer Act was amended to make the width of the claim from base to base of the hill and 250 feet in the direction of the stream. An amendment in 1908 made the placer claim 1,000 feet wide and 250 feet in the direction of the stream.

In the years 1899, 1900, and 1901 two hundred and fifty-eight hydraulic leases were issued. Many of these conflicted with placer rights. During the last five years the Government has enforced rigidly the cancellation of all leases that did not comply with statutory conditions. Two hundred and fifty leases have been cancelled, and thus much ground has been thrown open for re-staking.

#### EXCHANGES.

**The Colliery Guardian, July 30, 1909.**—A calamitous explosion occurred at the Maypole colliery, near Urgan, on August 18, 1908. The enquiry has just been concluded. The opinion that the explosion was caused by a blown-out shot seems to have most reason. The Colliery Guardian refers to the folly of treating the "permitted" explosive as a "safe" explosive. While admitting fully the need of more inspectors, our contemporary emphatically declares "that one of the lessons of this enquiry is to strengthen the belief that the 'practical' man is by no means fitted, simply as such, to fill responsible positions in which he is called upon to exert his critical faculties." . . . "As regards the suggestion that the offices of foreman and shot-lighter should be kept separate, we are somewhat at a loss to understand the line of reasoning that has prompted the jury to make this suggestion; the duties are very nearly akin in many respects, and the foreman is probably the official best acquainted with the conditions under which a shot has to be fired." If the fireman is to be relieved from an excessive burden of work, the Guardian intimates that this can best be done by reducing the size of his district.

**The Iron and Coal Trades Review, August 6, 1909.**—The averting of a general coal strike in Great Britain is dwelt upon editorially by the Review. A strike of this kind would have been "a national calamity of the worst kind." Moderate counsels prevailed during the



closing negotiations. Notwithstanding the good offices of Mr. Winston Churchill and Mr. G. R. Askwith, K.C., a basis of agreement was not easily found. "Happily, however, it was eventually recognized . . . that concessions by both parties to the dispute were inevitable if industrial war was to be avoided."

Although partly of a provisional nature, says the Review, the agreement certainly provides a broad and substantial basis for the permanent settlement of the questions at issue. "On the main issue of the 50 per cent. minimum, or 6s. per day wage, the miners have been entirely successful having secured the recognition of that principal. . . . On the other hand, an arbitrator is to decide upon a basis price to govern the 50 per cent. minimum, and is to revise the scale of increments," taking into consideration the effect of the new minimum upon the relation between wages and prices.

The crisis is now over, and the outcome, while it certainly does not favour the colliery proprietors overmuch, may be described as "peace with honour." To these proprietors "the thanks of the country are due . . . for the way in which they have surrendered clearly established rights without getting much in exchange. . . . On the other hand, the action of the Miners' Federation of Great Britain cannot be regarded in a very favourable light." Labour leaders and officials have been guilty of "an arrogant parade of power which accords but too well with the truculent attitude taken up by labour and many of its self-styled leaders of late."

#### PERSONAL AND GENERAL.

Mr. H. Mortimer-Lamb was in Toronto on August 23rd.

Mr. Martin Nordegg has returned from a visit to the coal areas of the German Development Company in Alberta.

Mr. Paul S. Couldrey was presented with a silver loving cup on August 14th on the occasion of his resigning the post of general manager of the Josie Mine, Rossland, B.C. Mr. Couldrey has accepted a position with the British Columbia Copper Co., at Greenwood.

Mr. Allan Greenwell, editor of The Colliery Guardian, London, Eng., is in Toronto. Mr. Greenwell will probably visit Alberta and British Columbia before returning to England.

Mr. F. C. Armstead, supervising engineer of the stoker department of the Westinghouse Machine Company, who for a number of years, has been located at East Pittsburg, Pa., has moved his headquarters to the Westinghouse Works, Attica, N.Y., where the stokers are manufactured.

#### OBITUARY.

Andrew Colville, who died on July 15 at Nanaimo, Vancouver Island, British Columbia, was born in Blairtown, near Peterborough, Ontario. For several years he was a school teacher in that province, and there, too, attended a business college for a year. Leaving Canada in 1886, he proceeded to North Dakota, where for two years he engaged in farming, going thence to Montana to put in a year at railroad construction. In 1889, at Lethbridge, Alberta, he commenced coal mining, working there as a miner for four years. In 1897 he was appointed superintendent for the Electric Peak Coal Company, at Hoar, Montana. During 1898-9 he was in charge of the outside operations of the Diamond Coal Company, Diamondville, Wyoming, and in 1900 those of the Carbon Coal Company, Carbonado, Montana. In 1901 he went to the Crow's Nest Pass coal field, British Columbia, where, after having been for about two years overman of Nos. 2 and 3 mines, Coal Creek, he was made superintendent of the Crow's Nest Pass Coal Company's Coal Creek colliery. He filled that position satisfactorily for four years, when he resigned and went to Eastern Canada for six months. In July, 1908, he returned west, going to Nanaimo, but he did not again undertake the responsible duties of a coal mine superintendent. He died among friends (fellow-members of the Canadian Mining Institute), who had known for many years his worth as a man and his competency as a mine manager.

## CORRESPONDENCE.

Editor Canadian Mining Journal:

In the railway article in issue of August 15 reference is made to copper in the Eastern Townships in such a way that a stranger would understand that none of these deposits have been successfully worked, while as a matter of fact we have at Capleton, within a few miles of Sherbrooke, two of the biggest copper mines in Canada—the Capleton and the Eustis. The former is owned by the Nichols Chemical people, the latter by Col. Eustis, of Boston.

They have been in successful operation for around forty years. The Eustis is down over 3,000 feet, employs 150 to 175 hands, and produces about 1,500 tons of ore per week. The ore contains as high as 45 per cent. sulphur, and much of it is shipped to chemical firms in Boston, who take the sulphur, and the residue goes to the Eustis smelter in Norfolk, Va.

The Nichols Chemical Co. also take several hundreds of tons each month. No better equipped mine can be found, and men and property are well cared for, but as with the Capleton it is a close corporation, and no stock for sale, consequently is not advertised in the stock columns of our daily papers. The Capleton mine extracts the sulphur from its ore, and makes glauber salts, nitric and sulphuric acids, etc. These mines have made millions for the owners—Americans in both cases.

Over the range to the west is the Norton property, owned by A. O. Norton, the well-known manufacturer of ball-bearing jacks, of Boston. He has been systematically blocking out, not extracting ore, for a long time, and has a large tonnage in sight. He is said to be contemplating the erection of a smelter. To the north is the pioneer mine of the region, the Ascot, a well-



equipped property, under the management of John McCaw.

At Lake Memphremagog is the Smith property, now being actively developed, by the same people who are working the McDonald property in Weedon.

In Ditchfield a new property has recently been opened.

What the district needs is not ore, but a custom smelter, at some central point, like Sherbrooke. The ore in the Sherbrooke belt is pyrite, and not rich enough in copper to pay for shipping to England, but, as proved by the Eustis and Capleton, with proper capital and smelting facilities, can be made to pay handsomely.

K.

To the Editor Canadian Mining Journal, Toronto:

Sir,—In view of the recent attacks made in the London Mining Journal on mining administration in India, and also both directly and indirectly on the Director of the Geological Survey, we have deemed it advisable to send you the following extracts, one of which is taken from the Mining Journal of June 26th, 1909, page 801, and the other from the published evidence given by Sir Thomas Holland before the Royal Commission upon Decentralization, and published in Blue-book Cd. 4369 (Vol. X. of Minutes of Evidence, p. 47):—

From the Mining Journal of June 26th, 1909, p. 801, leading article headed "Mining Administration in British India."

"We cannot close our observations on the evidence tendered to the Commission without noting the light thrown by the report on the sincerity of Sir Thomas Holland's attempt to suggest that we had imputed corruption to Government officials in India. As an argument against the establishment of a separate Provincial Survey, the Director of the Geological Survey said:

"If I transferred an officer, say, to Burma, or any province beyond my control, and he was the officer who governed the granting of mining concessions, I have not the slightest doubt that within a year, if he had only ordinary intelligence, he would discover that his salary *would*\* be only a fraction of his income.' We do not remember even to have seen the Chief of what is professedly a scientific body so frankly confess his distrust of his colleagues' honesty and professional pride."

Evidence of Sir Thomas Holland, Director Geological Survey of India, published in Blue-book Cd. 4369, being Vol. X. of the Minutes of Evidence taken before the Royal Commission upon Decentralization in India, p. 47:

Question No. 43455: "Is not an officer who has to deal with mining concessions in any part of the world subject to great temptation?"

"Yes; if I transferred an officer, say, to Burma, or any province beyond my control, and he was the officer who governed the granting of mining concessions, I have not the slightest doubt that within a year, if he had only ordinary intelligence, he would discover that his salary *need*\* be only a fraction of his income."

(\*The italics are ours.)

By changing one word in quoting the Blue-book, the Mining Journal has altered the whole meaning of the remarks made by the Director. In view of the comments made, it is for the Mining Journal to prove that this misquotation is accidental. Having regard to the claim of the Mining Journal that it "circulates all over the world," the writer of the article must know that it will be read by many to whom the blue-books are not accessible, for no assistance has been given by a reference to the particular volume in which the Director's evidence is recorded. As the inaccurate quotation has already received a start of some weeks before reaching us in India, we shall be glad if, by publishing this letter, you will assist in preventing any further dissemination of a grossly unjust insinuation.

With this sample before them, we can safely leave your readers to estimate the value of the attacks on the Indian administration recently made in the Mining Journal.

Needless to add, the relation between us and Sir Thomas Holland is one of perfect and mutual confidence.

We have been unable to communicate with three of our colleagues who are at present absent in the field, but we are convinced that if they had the opportunity they would join with us in appending their signatures to this letter.

T. D. LATOUCHE, Supt. Geol. Sur. of India.  
H. H. HAYDEN, Supt. Geol. Sur. of India.  
P. N. DATTA, Asst. Supt. G. S. of India.  
E. VREDENBURG, Asst. Supt. G. S. of I.  
L. L. FERMOR, Asst. Supt. G. S. of I.  
G. E. PILGRIM, Asst. Supt. G. S. of I.  
G. H. TIPPER, Asst. Spt. G. S. of I.  
H. WALKER, Asst. Supt. G. S. of I.  
K. A. K. HALLOWES, Asst. Supt. G. S. of I.  
G. DE P. COTTER, Asst. Supt. G. S. of I.  
J. J. A. PAGE, Asst. Supt. G. S. of I.  
H. C. JONES, Asst. Supt. G. S. of I.  
A. M. HERON, Asst. Supt. G. S. of I.  
M. STUART, Asst. Supt. G. S. of I.  
N. D. DARU, Asst. Supt. G. S. of I.  
W. A. K. CHRISTIE, Chemist, G. S. of I.

Editor Canadian Mining Journal:

In your issue of August 15th, I note among the personals from Sherbrooke, Que., reference to a visit of myself and the president of a dredge building company to the property of the Compton Gold Dredging Company, by which it would appear that the placing of a dredge on this property had been decided upon by the company, and this statement is somewhat misleading, although, I am quite aware, unintentionally so.

This property was tested last summer and considered to contain sufficient values in gold to possibly justify the placing of a dredge thereon. Further investigation, however, this year has caused serious doubts as to the advisability of going ahead without further tests, and it would perhaps be well to suspend judgment until such time as these further tests are made.

I might mention further that the company have sufficient funds subscribed to build a dredge, but in the



event of these further tests being unsatisfactory, such subscriptions will be returned in full, and the company is not offering any stock for sale at the present time.

Trusting that I am not imposing on your generosity in asking for space in your valuable columns for the above, I remain,

Yours very truly,

COMPTON GOLD DREDGING COMPANY.

J. F. McKenzie, President.

Montreal, August 24, 1909.

**The Mining Journal, August 7, 1908.**—Gold stealing on the Rand is the subject of renewed discussion. The Mining Journal supports certain preventive measures advocated by Mr. Albu. Chief among these measures is the arrangement of all amalgamation plates and extraction boxes under the control of the salaried staff. "In any case," says the Mining Journal, "whatever measures be taken, there can be no finality. As in all campaigns against fraud, it is a constant struggle of wits."

## SPECIAL CORRESPONDENCE

### NOVA SCOTIA.

**The U. M. W. A. and the Nova Scotia Coal Trade.**—The general situation that has been brought about in Nova Scotia by the policy of the United Mine Workers of America is a serious one for this Province, and it has already resulted in grave and permanent injury, not only to Nova Scotia, but to the Maritime Provinces as a whole. The question, however, is not a provincial one, nor is it one that is confined to the coal trade alone. It has a far wider import, and touches particularly the political independence of Canada. One feature of the U. M. W. A. platform is International Socialism, and it is this that has attracted to the ranks of the U. M. W. in Nova Scotia the miners who come from the countries of the Old World. The dream of the International Socialist of "The Parliament of Man, the Federation of the World," is an attractive one, and the arguments of the International Trades Unionists are seductive and plausible to the unthinking. But, after all, they are but dreams. Everything in a sovereign country must be subordinated to the national entity. Trades unionism is merely one of the components of the political life of this country, and it has no more right to override the limits of our frontiers than have the main divisions of our national political parties, nor has trades unionism any right to divorce itself from national economics. If it attempts to do so, disaster must surely result, as it has already resulted in Nova Scotia.

The legislators of our country, recognizing that the coal mines of the United States and those of Canada are competitors, or, to use a more fitting word, opponents of each other, imposed a protective duty on imports of coal from the United States into Canada. Our legislators, also, for the protection of the Canadian workman, passed the law known as the Alien Labor Act, which forbids to Canadian employers the opportunity of engaging workmen in the United States in competition with the citizens of this country. Our law also forbids any United States corporation from operating in Canada to the detriment of Canadian trade, and, before it will allow them to do business here, these corporations must be incorporated under our "Companies Act," and they must obey the constituted authority of this nation. These barriers, along with many others, have all been laboriously erected by our Parliament to protect Canadians and to consolidate our national growth. What has happened in Nova Scotia? This has happened: Under the name of trades unionism every one of the protective barriers erected by our legislators against the encroachments of the United States has been swept away; a direct attack has been made upon our coal industry by alien strike leaders engaged and paid in the United States out of the funds of a United States corporation, and the result is that American coal is now being unloaded in Sydney Harbour, while some three thousand Nova Scotia miners are idling on the streets of Glace Bay and of Springhill. We have said that all this has been done in the name of trades unionism,

but in reality what has happened is tantamount to sedition and to treason, which has been fomented by alien enemies who have conspired against our trade and to destroy our native institutions. That these enemies of our country have been helped in their work of destruction by some misguided citizens of Canada may add to the irony of the situation, but does not minimize the menace.

The policy and the actions of the United Mine Workers of America in Nova Scotia have not been those of a legitimate trade union, but they have been predatory, and foolish withal, and are calculated to work great harm to the proper aims of trades unionism. It is not calculated to advance the interests of labour for a powerful union to embark upon a policy of extermination against a smaller one, and this is what the U. M. W. A. have done. The claim of the Provincial Workmen's Association to represent the workmen of Cape Breton has been shown to be well founded. At Inverness and Port Hood the attempts of the U. M. W. to call a strike were abortive from the beginning, and to-day the president of the Inverness U. M. W. Local is working in the mines at Glace Bay. Despite all the assertions of the U. M. W. A. leaders to the contrary, we are in a position to know that the U. M. W. A. strikers at Glace Bay number less than one-third of the mine's force of the Dominion Coal Company, and less than one-fourth of the total number of that company's employees in Cape Breton. Taking into consideration the disparity in numbers between the U. M. W. sympathizers and the P. W. A. members, to the great disadvantage of the U. M. W., the fact that the Dominion Coal Company has a binding contract with its workmen, which precludes any possibility of change until 1910, the fact that a Board of Conciliation has strongly advised against the recognition of the U. M. W. and has upheld the position of the Coal Company in every particular, and the fact that the workmen of the Coal Company have no grievances which need redress, what should a wisely advised trades union have done in the case of the Glace Bay dispute? They should have retired in favor of the older union, or until a more favorable opportunity for success presented itself. But the U. M. W. A. leaders would not do this; instead they have engaged upon a useless and foregone struggle, in which they will find it necessary to dissipate a large portion of the accumulated funds which were contributed by American miners for the defence of their union in the coal fields of the United States. The leaders embarked upon the Glace Bay strike with the full knowledge that in order for the U. M. W. A. to succeed, the P. W. A.—a Canadian union—must be destroyed. In Inverness County the U. M. W. A. have thrown money away foolishly and without any return. At Springhill they have declared a strike for higher wages after a Board of Conciliation had proved absolutely that higher wages were impossible if the Cumberland Coal Company were to continue in business. At this place they withdrew the pumpmen and firemen, and but for the per-



sonal efforts of the officials of the company the Springhill mines would have been allowed to fill with water and gas, and the horses would have starved in the pit. Had they been able, the U. M. W. A. would have done the same thing at Glace Bay, and they did attempt at several of the mines to stop the operation of the boilers and pumps.

At Springhill the apparent result is going to be the closing of the mines of the Cumberland Coal & Railway Company, and eventually a reduction in the wages of the workmen.

What is the net result to Nova Scotia so far? First, a partial paralysis of the coal trade of the Province, coincident with the replacement of Nova Scotian coal by United States Coal.

Second, the harassing of the Provincial Workmen's Association, and financial loss to the workmen of the Province.

Third, a large expenditure of union funds for purposes altogether outside of unionism, this expenditure being made by men who are well aware that the money might just as well be thrown into the sea.

The attitude taken by these American strike-breeders towards Nova Scotian unions and Nova Scotian methods of doing business may be illustrated by quoting a few statements which have appeared in the public press from U.M.W.A. sources: The "Standard" recently taunted the management of the Coal Company on its inability to run a strike properly, giving as a reason for its opinion the inexperience of the Coal Company in strikes. On the other hand, the "Standard" praised the methods of the U.M.W.A., which, they stated, much practice had made perfect. If the worst that can be said about the management of the Dominion Coal Company is that this company's officers have had no experience of strikes, most sensible people will wish there were more such companies, and will regard the taunt as a genuine testimonial to the tactful management of the Coal Company, and the excellent relations which have existed hitherto between the workmen and the heads of the company.

Mr. McCullough, in attempting to defend his action in calling out the firemen and pumpmen at Springhill, writes: "The policy of the operators is to operate the mines of Nova Scotia with non-union labor, or the P.W.A., which means the same thing in the final analysis." This same gentleman, in a speech at Sydney, referred to Canadian soldiers as "paid pimps," and in a letter to the U.M.W. Journal he wrote that Nova Scotian newspapers were raising the cries of "Canada for the Canadians, Canadian National Unionism, and 'such rot.'" We wonder what would be the fate of any Canadian who said and did the things in the United States that Mr. McCullough and his colleagues have done in Nova Scotia. A Vigilance Committee, a fence-rail, and some tar and feathers would likely assist his ignominious exit.

### QUEBEC.

Sherbrooke—It is reported that the Spalding iron property has just been bonded for \$500,000, the lessees to expend \$50,000 in development work. Yet the deposit has been known for years. Those who might have taken it up didn't think it worth while, as good mines are always 'way off West.

The new Megantic copper property seems to show improved values in both gold and copper, as depth is gained.

The New York Engineering Co. is looking into the possibilities of gold placer ground in the Eastern Townships, particularly in Compton Co. Several other dredge-making concerns are endeavoring to get a contract from the Compton Gold Dredging Co., but the latter may naturally favour a concern that will get a good part of the machinery put up in Quebec.

Mr. John McGaw is pushing work vigorously on his property in Brampton.

The management of the Eastern Townships Agricultural Association has kindly granted space for a mineral exhibit at the

coming Fair, and all interested can send specimens, properly labelled, to Mr. Kenneth E. Kennedy, Sherbrooke, Que., with any particulars desired, and they will be taken care of, and arranged, also returned when desired.

In spite of all the newspaper space devoted to asbestos news, there are more properties that can be bought at reasonable prices than cash purchasers. All the present producing mines, not so very long ago, were prospects with no better surface showing than many of these. The claims so often made by self-styled authorities or "experts" that Thetford has all the good stuff, or that the present producing mines control all the good ground, is pretty likely to be exploded. Of course a prospect is not a mine, but all mines were once prospects. To hear some of these people talk, one would think that mines were found, not made.

It is true the Eastern Townships has no Alex. Gray to write of its mineral possibilities, and the larger city dailies, while devoting much space to Ontario mines, and even prospects, cater more to the stock selling side than to real mining.

These papers no doubt know which side their bread is buttered on, and having in mind some premature booming done for the higher lights, when British Columbia was to the fore, now do not dare refer to any new or promising region until it is vouched for by some gentleman eminent in some line quite apart from mining, but sufficiently well known to qualify as an authority, on account of his financial standing, on any old thing.

And yet it is more than edifying to read some of the stuff they do print. And in whose interest is it? Not that of the ordinary country reader, nor of the little old Province of Quebec.

### ONTARIO.

Cobalt—The Baily Mine has ordered a complete plant, excavations are now being made, and the ground is being cleared preparatory to erecting the necessary buildings. The plant consists of a compressor, a 100 horse-power boiler, a hoist, drills, and other necessary equipment.

A winze is being sunk from the 400-foot level of the Kerr Lake Mine, and will be continued 100 feet. This will give a total depth of 500 feet and will be the deepest working in the camp. So far as they have gone there has been no change in formation, and the ore continues to carry its high values. When the winze is completed a cross-cut will be run under the shaft, and the two levels will be connected at that point.

The Nancy Helen has struck high-grade ore in three new veins. Two of these are about an inch in width and carry ore assaying about 1,000 ounces in silver. These veins come off the Buffalo. The other one is about five inches in width and carries higher grade ore. This latter vein is apparently making for the City of Cobalt property. These finds were made on the sixty-foot level. The Nancy Helen resumed underground operations a short time ago, having been closed for some time while diamond drilling was going on.

Mr. George Taunt who is largely interested in the Lucky Boys and Chesterfield properties in the Larder Lake district, has interested some English capitalists in the Harris-Maxwell, on which they have an option. Mr. H. P. DePencier has been appointed manager of the Reddick. There are four steam drills working on this property testing the surface. The shaft is now down 120 feet, and there are said to be good values in the bottom. The Cleopatra, adjoining the Harris Maxwell, has a force of men working on the surface, and the results obtained so far have been very satisfactory.

The new surface vein found recently on the Nipissing has now been trenched for a distance of 200 feet and it shows a width of about six inches of high-grade ore. This is the most



valuable discovery for this company, since the big vein was found in the No. 64 shaft. Further development on vein No. 127, carrying smaltite and niccolite, has shown it to contain some values in native silver.

The Coniagas will build a shaft house over their working on the corner of Prospect avenue and Silver street, which is right in the centre of the town. The shaft will be sunk to a depth of 86 feet and at that point it will correspond to the 150-foot level of the main shaft.

The Temiskaming has good ore on the 300-foot level and is drifting on the No. 1 and No. 2 veins, while a crosscut is being run to catch the No. 3 vein. Good progress is being made with the concentrator, and the company hopes to have it completed about the end of December.

Much trenching is being carried on on the lots of the Gillies' Limit purchased from the Government, the finds recently made on the Waldman and Young-O'Brien lots, having given great encouragement to the owners of the other properties. The Waldman vein has been traced on the Young-O'Brien lot for a distance of 90 feet, and the values are very good. Next week forty men will start trenching the surface of the Cleopatra, which is owned by Mr. Bannell Sawyer, of Montreal.

A good discovery was made recently on the Silver Alliance property in the Elk Lake district. At a depth of twenty-five feet in the shaft the vein widened from a mere stringer to between six and eight inches of calcite carrying good values in native silver. The Silver Alliance property is situated in Tudhope Township about four miles from Elk Lake, and is owned by Montreal people. Another good find was made on the Haentschel claim in the Township of Farr on Panty Lake. It consists of a vein of calcite carrying values in native silver. The York claim, which is located near the Otisse Currie, located a vein on the surface carrying smaltite, niccolite and native silver. The vein was stripped for a considerable distance and is found to average about four inches in width.

The dispute between the Nova Scotia Mining Company and the Peterson Lake Mining Company has culminated in the issue of a high court writ against Edward and D. M. Steindler, in which the Peterson Lake people claim the following:

1. \$1,000,000 being the amount of shares of plaintiff's stock wrongfully issued to the defendants.
2. \$50,000, monies of the plaintiff's wrongfully appropriated by the defendant, Edward Steindler, with the aid and consent of his co-defendant.
3. In the alternative the like sums by way of damages for misfeasance and breach of trust on the part of the defendants as trustees for and directors and officers of the plaintiffs.
4. Delivery up and cancellation of the certificates now held by the defendants or either of them for stock of the plaintiffs.
5. An injunction restraining the defendants from acting as shareholders in respect of the stock issued to them and from selling, charging, parting with, or otherwise dealing with the shares of the plaintiffs' stock issued to them and still held by them, and also restraining the defendant, David M. Steindler, from acting as a director of the plaintiff company.
6. Such further and other relief as the plaintiffs may be entitled to.
7. Costs of this action.

In sinking on the No. 3 vein of the La Rose, the Keewatin came in at the 100-foot level, but the shaft was continued and is now thirty-five feet below the contact. The ore was found to continue and the high values were maintained. On the other side of the line the O'Brien is working on the same vein and is still taking out good ore. On the latter property the vein has been in the Keewatin all the way.

There is to be another sale of the mining lands of the Gillies' Limit comprising 393 acres remaining from the total of 870

originally offered. The bids previously put in for these lots were not considered high enough by the department but in view of the finds recently made on the Waldman and Young-O'Brien lots, they will probably now command higher prices. The Provincial Mine is also to be sold. This property consists of forty acres and is situated in the Savage and Silver Bar group near Cart Lake. It was closed down some time ago while some diamond drilling was being done. A hole was bored near the Savage Mine and at a depth of about 165 feet from the surface a vein carrying high-grade silver values was cut. Tenders for the lots and the mine will close on September 13th.

About two hundred feet from the Foster boundary and half way between the north and south lines a new find has been made on the Lawson that for width and values closely approaches the original silver sidewalk. When first found it was not considered remarkable, but a little development showed it to contain a good width of very high grade ore. In one place there is fifteen inches of cobalt assaying very high in silver. When the vein had been trenched for a short distance it was found to split at both the north and south ends, the branches being about six inches in width. This find was made in the Keewatin. This makes a total of seven veins found on the surface up to date and the probability is that underground development, as has been the case in other mines, will show up still more. Development on this property is at present limited on account of the small capacity of the compressor. The main working shaft will be the one that has been sunk on the main vein, and which is now down 98 feet.

Further development on the new find made at the Foster shows the vein to be from three to five inches wide. It is a cobalt vein and carries high values in silver. The opening up of the Lawson has led to a much more thorough prospecting of the Foster, and had the former properties not been tied up in litigation for so long these finds would probably have been made years ago.

Considerable interest continues to be manifested in the gold claims of Munroe Township, and work has been done on some of them. The principal properties there are the Green claim, the Kennedy claim, the Guelph Syndicate, the Surprise claim, the Painkiller Lake Mines, and the Wigwam claims. It is stated that the Kennedy claim has been sold to Mr. P. Farah.

The camp buildings of the University Mine were destroyed by a fire, which is supposed to have originated in the bunk house. The shaft house and power house were fortunately untouched, so that the work will be able to proceed without interruption. The University was an independent company until the original owners of the La Rose acquired control. The results obtained were not very encouraging and the mine closed down, until the La Rose Consolidated took charge and started work again. Since that time the outlook for the mine has been much improved.

The Northern Customs Concentrator, formerly known as the Muggley, is making progress with the addition to the mill. The buildings will shortly be completed and the machinery in place.

The district of South Lorraine continues to attract more and more attention, and the reports that come from there are very encouraging. A great amount of work is being done, and if the success obtained so far is any criterion it is safe to assume that this district will eventually become one of the most important outside of Cobalt. During the coming week the Keeley will ship one car of high-grade ore and one car of medium grade. So far this company has experienced considerable trouble with the plant that they installed a short time ago, but they expect to have it in good running order in a few days. The main development of the property is being carried on at the 130-foot level. The west shaft is being pumped out and when that is completed work will be started there also. The Wettlaufer will also ship forty tons of high-grade ore and probably a car of medium. Drifts are being run at the 60-foot level on



the vein on which the shaft was sunk. The vein is about six inches wide and carries a good amount of high-grade ore. A cross-cut was run from this level to a parallel vein on which drifts have also been run. This vein is about twelve inches wide with six inches of smaltite carrying silver.

#### BRITISH COLUMBIA.

**Rossland.**—Once again there is some stir and activity about the Le Roi mine, a small crew having been put to work getting things in form for the extensive development that will be done in the big mine during the next several months. It is stated that a fund of about two million has been raised by Managing Director McMillan and the Board of Directors, in order to carry out a big plan of development that was suggested by Mr. Carlyle. While the main work will be done from the 1,650 to the 2,650-foot level by diamond drill, operations will not be confined to that particular territory, but other promising regions of the Le Roi ground will be opened up. It is certainly pleasing to Rosslanders to see work once more going on at what we termed the "premier mine of the camp" until the Centre Star group forged to the lead.

Twenty tons of picked gold ore was shipped from the once prominent I. X. L. mine during the past week. The lessees keep working away in the altered depths of this property in a state of semi-excitement. While the ore they are extracting is about paying expenses, it is a gamble. Any day they may open up one of the old-time bonanza pockets, when they, the mine and the West belt will spring into sudden prominence. Every one in Rossland believes some one will strike it in O. K. Mountain some day, but the fates hold the secret as to who the lucky one will be. Both the O. K. and I. X. L. mines have been worked every few months by lessees, each party striking new ore and making their venture pay, but the expected grand coup is still to come off.

The Consolidated M. & S. Co. of Canada is making things hum about the Centre Star group here, and Dame Nature is doing her share by pushing goodly quantities of pay ore into the various workings of the mines. For the week ending July 24th the shipments from this property reached a new record figure for the current year, 4,680 tons having been sent to Trail smelter. This exceeded the prior high figure (4,280 tons for week ending May 1st) by 400 tons. The low shipment mark for the Centre Star this year was 2,950 tons during the week ending January 9th. The Consolidated St. Eugene mine at Moyie also broke a record in the early part of July, shipping for the week ending July 19th 975 tons, exceeding the week ending June 29th, when 807 tons were shipped. The Snowshoe mine of the Consolidated, not to be outdone, also made a new high record, shipping 4,083 tons for the week ending July 31st, the heaviest tonnage from the mine this year. These heavy shipments pouring into the bins of the company's smelter at Trail naturally make things lively at that point. The gross value of the output of this reduction works for the past month was over \$800,000. As everything points to heavier shipments than ever in the very near future, the plant is being enlarged as rapidly as possible, so that the anticipated work may be fully met when the proper time arrives. During the fiscal year ending June 30th this works produced gold, silver, copper and lead to the value of approximately five and a half million dollars. About 45,000 tons more of ore was treated than during the preceding year. From the electrolytic refinery \$2,700,000 of the output named above was derived. There is little doubt that the figures for the current fiscal year will far exceed those of the past year, provided, of course, no great drawback occurs. It is worthy of note that this modern refinery on the silvery Columbia has supplied the Mint at Ottawa with over 250,000 ounces of gold for

coins. Nearly 200,000 ounces of .999 fine silver is shipped from Trail each month to the Orient for coinage. To digress: What a strange story an ounce of this Canadian silver might tell could it speak and should it return to Canada years hence; a story of happiness and misery, cruelty and mercy, of life and death—it is more likely, however, to meet the fate of being buried in the ground by some wretched Oriental miser.

**The Boundary.**—Wheels are again getting into motion at the property of the British Columbia Copper Co., part of the crew having been put to work. As yet smelting operations have not been resumed, but there is little doubt the furnaces will be blown in as soon as ore and fuel conditions are in regular shape. As is the case with several of the other big mines of Southwestern British Columbia, the outlook for the B. C. Copper Co. is very good for the immediate future. It is very likely that a profitable arrangement will be made to smelt the ores of the mines of the New Dominion Copper Co., and with railway facilities to mines in nearby camps controlled by the Copper Co. a busy and profitable season of work is promised.

The mines of Phoenix have shipped over half a million tons of ore of a good average grade already this year and while the figures run somewhat below last year to this date, still if present plans here carry it is likely that last year's record will be passed easily. As is generally known, Boundary ore yields about 24 lbs. copper to the ton, so that the recovery thus far during the current calendar year has been over 24,000,000 of the red metal. Both the Granby and B. C. Copper Companies are turning out a good grade of crude copper from their smelting and converting plants, and can lay it down at Eastern refineries for approximately ten cents per pound. There have been months when this cost has dropped as low as eight cents per pound, but this figure cannot be counted on as a year in and year out cost just at this time. Men who ought to know, however, predict an average eight-cent cost for copper from the Boundary in the not distant future; this will be made possible by improved conditions both in the mines and in the smelting and converting plants; the converting itself figuring prominently in saving on freight.

The reorganization lately of several local mining and reduction companies of more or less prominence has ended disastrously for those of the shareholders who did not feel like complying with the "freeze-out" conditions laid down by the reorganization committees. In many cases investors bought stock at par for an "investment," figuring that the prominent men connected with the companies assured exemption from wildcat tactics, and that in due course of time they would receive some of the substantial profits which the mining industry as a whole is yielding to-day. The day is coming when a man who buys one share of stock in an incorporated company will have his interest protected but what can we do to hasten this state of things? It does not seem just that a wage-earner who stints himself of luxuries, we will say, and puts his savings into a corporation, in an effort to provide for that "rainy day" that we all fear, should lose that estate which in a crisis may mean life or death to himself and family, in order that certain predatory interests may acquire a valuable property at a mere pittance. When the show-down comes it is an uneven battle, an organized force versus a disorganized and helpless lot of shareholders. As a general thing, stock in a company is sold the first thing, and stands a paramount first mortgage against the concern; then those "inside," with the aid of their promoters stock and the proxies which the innocent shareholders send them, vote to mortgage everything, giving a first mortgage, and the stock that was previously secured by certain assets is converted into worthless paper, while the friends of the "insiders" get a strangle hold on the company that was put on its feet by the money of the small investor. The question is, who, or what organization, that is in the right position, is going to start the



work that will place the mining industry and the capitalization of its different branches on a plane that is above wildcatting? We have in our midst predatory trusts, workmen's unions and farmers' unions; the next big movement will be for a Consumers' Protective Association, for the others are getting too high-handed altogether, so what's the matter with an organization for investors that will fight their battles in Parliament and throughout the land? Its eye, if vigilant, might strike fear to the hearts of those Black Knights who would make a little easy money by aerial financial tactics.

**Nelson.**—Several of the French capitalists who are interested in the historic Blue Bell mine visited the district during the past week. It is announced that French capital is being consid-

erably attracted to British Columbia, and that large sums of money from Parisian capitalists will find their way to the mines of this country in the future. It would surprise most people to know how many coal and mineral properties are now controlled by French capital in this Province.

The old Fern mine has again been reopened, and is to be worked on a good scale. Another good strike is reported from the Westmount. A 3-foot vein has been uncovered in one of the lower levels. About twenty men are working on the property. Auriferous gravel that is said to run from \$10 to \$20 to the pan has been found on Summit Creek. This is not surprising when it is known that so much gold-bearing rock exists in the vicinity of this rivulet.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Sydney.**—The excavation work for the Dominion Iron and Steel Company's four batteries of new coke ovens is reported to be well advanced.

The four new batteries will comprise 30 ovens each, and the cost will be about a quarter of a million.

**Sydney, Aug. 24.**—More skilled miners went into the Dominion Coal Co.'s mines to-day. Of these, twenty-six arrived at Sydney last night from Inverness County and were taken immediately to Glace Bay by train. While this train was passing through Gardiner, near No. 1, two rifle shots were fired at it from the neighboring woods. Fortunately no one was hit. Yesterday's output at the mine was the best since the beginning of the strike, 6,470 tons being taken out of the pits and 4,862 from the banks, a total of 11,332 available for shipping. The steamer Dominion has sailed for Philadelphia to load a cargo of coal for the Steel Company.

Last week's shipments by the Dominion Coal Company were 60,011 tons, 48,071 by steamers; 3,079 by schooners, and the remainder, 8,869, by rail. Last week's shipments were the largest since the strike began.

**Glace Bay, N.S., Aug. 24.**—John Moffatt to-day answered the charge that the Provincial Workmen's Association brought about the present industrial strike in the Province by sacrificing their members' interests, when he issued a statement showing what that organization has done since he has become its head. To the charge made against him by a section of the Conservative press, that he has been the tool of operators, he replies showing the concessions he has secured for the men since he became grand secretary of the P. W. A. eleven years ago, including two general increases in wages and numerous partial ones.

The local industry was, he claims, materially aided by wage agreements whereby labour troubles were obviated for periods of years; double as much work secured, increased business thereby brought about, and improvement in working conditions, until the miners in Nova Scotia now labour amid surroundings unsurpassed anywhere for safety and sanitation. These are the main features of his administration which he points to in answer to the assertion that he has betrayed his trust.

### QUEBEC.

**Sherbrooke.**—The New York Engineering Co. has shipped two drillers, an Empire and an Empire, Jr., to be used in testing glacier ground in Compton. On one property, this will be the final test prior to installation of machinery, on others, more of a preliminary nature.

**Thetford Mines.**—Notwithstanding the apparently quiet state of the asbestos market, all the mines in this district continue to work to their full capacity day and night shifts, and there are

probably more men employed at present in connection with the mines than ever before.

Some of the mines have nearly completed large additional storage sheds, some are in course of construction, while others are contemplated. All of which would indicate that there will be no material cessation of operations during the coming winter.

A noticeable feature of the past few months, and particularly so considering the large number of men employed, is the fact that there have been very few strikes, either of a slight or serious nature. This is worthy of note, for an erroneous impression has existed that there are numerous and frequent accidents attendant to the mining and milling operations. In comparison with the many other extensive industries of the Province, in proportion to the number of men employed, the asbestos mining district will be found to show up most favourably with a very small percentage of accidents.

### ONTARIO.

**Cobalt.**—The Provincial Mine is supplying compressed air to the Waldman property near it on the Gillies' Limit and to the Gould Consolidated on Cart Lake.

**Cobalt.**—Both the Keeley and the Wettlaufer mine, South Lorrain, will ship ore this week (Aug. 21st).

The Page brothers, of Butte, Montana, who hold the world's championship for hand drilling, won the recent drilling contest in Cobalt. They drilled 43 1-8 inches in 15 minutes. The first prize was \$1,000.

**Cobalt.**—At the Nancy Helen mine three good veins were cut in the second week of August. None of these veins outcropped on the surface.

**Dryden.**—There is a probability that the Baden-Powell mine at Eagle River, which has been closed down for some time past, will again be re-opened, the management of the property having recently received instructions from headquarters relative to an early resumption of operations.

### BRITISH COLUMBIA.

**Fernie.**—The coal miners in the Crow's Nest country are forming a Canadian Mine Workers' Union being dissatisfied with the late strike called by the American officials and by the fact that the unions refused to financially aid the strikers called out under their rules.

**Coal Creek.**—On August 15 fire destroyed 16 buildings at Coal Creek, including the Coal Creek Club.

**Nelson.**—The compressor plant of the Hall mines was destroyed by fire on the morning of August 20. The loss will exceed \$15,000.

**Rossland.**—Reports from the property of the Fife Mines, Ltd., indicate that a fine body of gold-copper ore has been found.

**Nelson.**—The mining outlook in Kootenay continues to improve. The latest deal of importance has just been closed whereby a Nelson syndicate has purchased the well known Athabasca mine and mill situated on Toad Mountain. The property has yielded large returns in the past but has been closed down and in litigation for some years. The vendors were the Bank of Montreal. The property is equipped with a ten-stamp mill, ten-drill compressors and 35-ton cyanide plant and a half-mile of tramway. Electricity is the power used. The mine contains over two miles of workings. This is only one more instance of valuable properties being reworked.

An important strike of high-grade ore is reported on the Mother Lode mine at Salmo, which indicates a large body of rich ore. Interest in the Slocan is steadily reviving, seventy men are busy at the Vancouver at Silverton. The Hewitt of Silverton will be on the shipping list once more, while reports from the Mollie Hughes at New Denver are decidedly good. Twenty men are at work on the famous Payne mine at Sandon, and many mining properties are being worked. Miners are hard to get and are wanted all over the district.

Ore shipments for the week are up to the best average for the year, and a further increase may be expected next month. The Consolidated Smelter at Trail received 11,000 tons this week, a record for the year.

## YUKON.

**Dawson, July 31.**—Klondike never saw such activity in its quartz properties as to-day. The quartz recording office has been so crowded of late with applications, renewals, and the like, that an extra clerk has been put on to assist Bert Brown, the quartz recorder.

Last month 110 quartz claims were located, and this month nearly 150 have been applied for to date.

Each quartz claim is 1,500 feet square. Taking this area 150 times, one will see that the quartz properties located during the present month will cover an immense area.

One point about the quartz activity is that the new staking is not confined to any one locality. The boom is on in every part of the district from Twelve-Mile to Sixty-Mile, from the high ridge dividing the camp to points along the Yukon; from Dawson to White Horse; in fact, everywhere throughout the territory.

While the quartz locations are going on, the owners of promising quartz also are spending not a little in development. The Davison people are pushing their large tunnel with the big hydro-electrical plant on the Dome and the Lone Star properties soon will have their stamp mill at work. A number of others are talking of putting in small stamp mills, and some are convinced that they can make their expenses out of their rock with a stamp mill right from the start.

# MINING NEWS OF THE WORLD.

## GREAT BRITAIN.

The wages dispute in the Scottish coal trade was settled on July 31st.

The following are some of the terms of settlement:

A minimum wage of 6s has been conceded to the miners.

An agreement has been made for three years.

The amount of the equivalent of the minimum is to be referred to arbitration.

The amount of advances by steps is also to be arbitrated upon.

The masters, it will be remembered, asked for a reduction in wages of 6d per day, making them 5s 6d per day. This led to the dispute now happily ended.

### Text of the Agreement.

1. The Conciliation Board shall be continued with the provision that there shall be obligatory a neutral chairman (whose decision in cases of difference shall be final and binding), to be selected by such method as shall be mutually agreed upon by the parties, and, failing agreement, by the Speaker of the House of Commons, and the Board and this agreement shall remain in force until the 1st of August, 1912; and unless six months before that date notice of termination is given by either party, it shall remain in force thereafter subject to six months' notice of termination given by either party at any time.

2. The principle of the 50 per cent. on 1888 basis as a minimum wage is conceded, and wages shall not be reduced below that point. In respect of the concession of an immediate 50 per cent. minimum, it is agreed:

(a) That the basis price for the 50 per cent minimum and the subsequent steps shall be referred to an arbiter. The reference to the arbiter shall be adjusted by parties and shall be on the footing that the relation between prices and wages in the past is recognized as equitable for the purposes of this arbitration and that the new basis price shall not be below the recent basis price—namely, 7s 5.45d. In fixing the new basis price and steps, consideration is to be given to the effect which the granting of an increased minimum wage would have on the re-

lation between prices and wages and also any other new circumstances bearing on increased or decreased costs since the agreement of 1904 was entered into which the arbiter considers relevant.

(b) That if for any month or months during the period from the date of this agreement to 31st March, 1910, the ascertained prices do not warrant a 50 per cent. wage under this memorandum, then for a like number of months any increased percentage in wages accruing under the memorandum shall be diminished by six and a quarter.

3. The neutral chairman, in giving his decision as to alterations in the rate of wages, shall take into account the state and prospects of trade.

4. Any difference regarding the interpretation of this memorandum or any difference regarding the terms of reference under clause 2 hereof, shall be referred to the decision of a neutral chairman to be mutually appointed by the parties, or, failing agreement, by the Speaker of the House of Commons.

5. The arbiter to act under clause 2 hereof shall be mutually appointed by the parties, and, failing agreement, by the Speaker of the House of Commons.

An interesting case occurred recently at Castleford Police Court, when 25 workmen of the Glasshoughton Colliery Company claimed damages from the company for breach of contract by refusing to allow the plaintiffs to descend the pit. An agreement had been signed by the colliery company that in the event of a pit gate meeting being held the men would be allowed an extra half-hour to get their lamps and descend on 28th June. The men contended that the agreement had not been carried out. The colliery company were ordered to pay 7s 6d each damages and the court costs in each case.

## SOUTH AFRICA.

The new 100-stamp mill being erected by the Roodepoort United will consist of stamps weighing 1,901 lbs., which will be the heaviest stamps so far put down on the Rand. The record capacity is at present held by the Cinderella Deep, which in May



crushed 9.17 tons per stamp per day with stamps of 1,650 lbs. Other innovations in the Roodepoort United plant are that five tube mills, or one tube mill for every 20 stamps, are to be installed; shaking tables are to be substituted for plates and the cyanide plant is to be of more than the usual capacity to secure low value residues. The capacity per stamp per day is estimated in excess of 12 tons, or approximately 36,000 tons per month, but in view of the results obtained from the Cinderella Deep mill the cyanide plant will be designed for an even greater quantity of tailings and slimes—namely 40,000 tons per month. A substantial reduction in present milling and cyaniding costs is expected. The new plant should be running in about May next.

#### WEST AFRICA.

Mr. W. A. Pritchard a rubber planter, has reported to the Government his discovery of a banket formation in the Birrim district, Akim, 100 miles behind Accra, extending over a large area.

It is understood that a Government expert has visited the district, the precise locality of which is kept secret, and that the reef is similar to the Tarquah formation.

The news is regarded in Government circles as of great importance and likely to accelerate the extension of the Accra-Akwapim Railway towards Kumassi.

The line is making steady progress and is expected to have trains running as far as Nsawam—28 miles—by October this year

#### UNITED STATES.

Within a month a hearing will begin in Seattle, Wash., that Denver Government officials assert will disclose proof of gigantic frauds in connection with coal lands in Alaska. The facts pointing to alleged frauds are known to Secretary Ballinger, of the U. S. Department of the Interior, and Fred. Bennett, Commissioner of the General Land Office. That more than 200,000 acres of rich coal lands in Alaska, some of them having veins 65

feet in thickness have been filed upon by dummy entrymen, procured through agents of six large corporations, the land office has evidence to prove, according to information made public.

The view of the General Land Office Commissioner Bennett, as given out, is that all entries found to be fraudulent should be canceled at once.

One of the coal companies involved in the alleged fraud is located in Seattle, another in New York, and still others in San Francisco, Omaha, and Chicago. The so-called dummy entrymen were recruited principally from the docks of Seattle, the mine of Butte, and the laboring classes of Chicago.

## Company Notes.

#### NEW DOMINION COPPER.

The last payment of the underwriters of the Dominion Copper Co. was made last Friday and the securities of the new company delivered to what now constitutes the present bond and shareholders, the old bondholders having received bonds and stock to which they were entitled.

The new company now has outstanding \$500,000 of bonds and 250,000 shares of stock. By the purchase of the old bonds, which have been exchanged for stock in the new company, and also by purchase of stock in the new company that has been delivered to the underwriters, the British Columbia Copper Co. interests are now large shareholders in this company.

An interim dividend of 1s per share has been declared by Bell's Asbestos Company, Ltd. The dividend was last raised in 1906 from 12 1-2 per cent. to 15 per cent. This latter rate has been maintained since then. The company has accumulated a reserve of £65,000 invested in high-class securities outside the business. Of this amount £50,000 is allocated to a special reserve fund for the equalization of future dividends. The carry-forward has gradually risen from £9,480 in 1906 to £15,266 in 1908.

## STATISTICS AND RETURNS.

#### STATISTICS AND RETURNS.

L. Vogelstein and Co. report the following figures of German consumption of foreign copper for the months January to June, 1909:

|                             |             |
|-----------------------------|-------------|
| Imports of copper .....     | 80,061 tons |
| Exports of Copper .....     | 3,913 "     |
| Consumption of copper ..... | 76,148 "    |

as compared with consumption during the same period in 1908 of 79,090 tons.

Of the above quantity 73,416 tons were imported from the United States.

#### COBALT ORE SHIPMENTS.

Following are the shipments from Cobalt for the week ending Aug. 14, and those from Jan. 1, 1909, to date:—

|                        | Week ending<br>Aug. 14. | Since<br>Jan 1. |
|------------------------|-------------------------|-----------------|
| Ore in lbs.            | Ore in lbs.             |                 |
| Buffalo .....          | 748,678                 |                 |
| Chambers-Ferland ..... | 961,010                 |                 |
| City of Cobalt .....   | 64,000                  | 1,002,522       |
| Cobalt Central .....   | 41,670                  | 519,474         |
| Cobalt Lake .....      |                         | 79,960          |

|                                |           |
|--------------------------------|-----------|
| Coniagas .....                 | 1,043,315 |
| Crown Reserve .....            | 182,800   |
| Drummond .....                 | 920,000   |
| Kerr Lake .....                | 1,298,146 |
| King Edward .....              | 183,740   |
| La Rose .....                  | 258,190   |
| McKinley-Darragh .....         | 122,350   |
| Nipissing .....                | 322,390   |
| Nova Scotia .....              | 480,810   |
| Nancy Helen .....              | 83,400    |
| Peterson Lake .....            | 40,000    |
| O'Brien .....                  | 1,565,742 |
| Right of Way .....             | 2,032,691 |
| Silver Queen .....             | 167,350   |
| Silver Cliff .....             | 123,820   |
| Temiskaming .....              | 1,446,060 |
| Trethewey .....                | 1,296,698 |
| Temiskaming & Hudson Bay ..... | 1,106,260 |
| Muggley Cons. ....             | 72,900    |

Ore shipments to Aug. 14, 1909, from Jan. 1, are 37,315,252 pounds, or 18,657 tons.

Total shipments for week ending August 14, 1909, are 1,198,750 pounds, or 599 tons.

**COBALT ORE SHIPMENTS.**

Following are the shipments from Cobalt for the week ending Aug. 21, and those from Jan. 1, 1909, to date:—

|                                    | Week ending<br>Aug. 21. | Since<br>Jan. 1. |
|------------------------------------|-------------------------|------------------|
|                                    | Ore in lbs.             | Ore in lbs.      |
| Buffalo . . . . .                  | 42,350                  | 791,028          |
| Chambers-Ferland . . . . .         | .....                   | 961,010          |
| City of Cobalt . . . . .           | .....                   | 1,002,522        |
| Cobalt Central . . . . .           | 39,310                  | 558,784          |
| Cobalt Lake . . . . .              | .....                   | 79,960           |
| Coniagas . . . . .                 | .....                   | 1,043,315        |
| Crown Reserve . . . . .            | 187,840                 | 4,043,315        |
| Drummond . . . . .                 | .....                   | 920,000          |
| Kerr Lake . . . . .                | 123,880                 | 1,422,026        |
| King Edward . . . . .              | .....                   | 183,740          |
| La Rose . . . . .                  | 206,600                 | 8,181,213        |
| McKinley-Darragh . . . . .         | .....                   | 1,237,556        |
| Nipissing . . . . .                | 190,120                 | 9,577,593        |
| Nova Scotia . . . . .              | .....                   | 480,810          |
| Nancy Helen . . . . .              | .....                   | 83,400           |
| Peterson Lake . . . . .            | .....                   | 281,110          |
| O'Brien . . . . .                  | 64,020                  | 1,629,762        |
| Right of Way . . . . .             | 61,990                  | 2,094,681        |
| Silver Queen . . . . .             | .....                   | 598,395          |
| Silver Cliff . . . . .             | .....                   | 123,820          |
| Temiskaming . . . . .              | 60,000                  | 1,506,060        |
| Trethewey . . . . .                | .....                   | 1,296,698        |
| Temiskaming & Hudson Bay . . . . . | .....                   | 1,106,260        |
| Muggley Cons. . . . .              | .....                   | 72,900           |

Ore shipments to Aug. 21, 1909, from Jan. 1, are 38,291,362 pounds, or 19,145 tons.

Total shipments for week ending Aug. 21, 1909, are 976,110 pounds, or 488 tons.

**B. C. ORE SHIPMENTS.**

The re-entry of the B. C. Copper Company into the shipping list was one feature of the week, the Mother Lode sending 2,730 tons to the Greenwood Smelter. The appended are the ore shipments and smelter receipts in detail:

| Boundary—             | Week.  | Year.     |
|-----------------------|--------|-----------|
| Total . . . . .       | 21,903 | 805,060   |
| Rossland—             |        |           |
| Total . . . . .       | 4,918  | 138,942   |
| Slocan-Kootenay—      |        |           |
| Total . . . . .       | 3,641  | 112,546   |
| Grand total . . . . . | 30,462 | 1,056,548 |

**SMELTER RECEIPTS.**

|                                  |        |         |
|----------------------------------|--------|---------|
| Granby, Grand Forks . . . . .    | 16,259 | 587,026 |
| Consolidated, Trail . . . . .    | 8,765  | 228,445 |
| Le Roi, Northport . . . . .      | .....  | 12,761  |
| B.C. Copper, Greenwood . . . . . | 2,730  | 143,235 |
| Total . . . . .                  | 27,754 | 971,467 |

The output of gold at the Rand in July was officially placed at 620,794 fine ounces, valued at £2,636,965.

The following table gives the output of gold at the Rand (in fine ounces):

|                    |         |         |
|--------------------|---------|---------|
| January . . . . .  | 615,113 | 560,329 |
| February . . . . . | 565,218 | 541,930 |
| March . . . . .    | 607,500 | 574,901 |
| April . . . . .    | 607,101 | 565,832 |
| May . . . . .      | 624,498 | 581,992 |
| June . . . . .     | 617,228 | 574,973 |
| July . . . . .     | 620,794 | 584,455 |

The total gold yield for Victoria for the last seven months amounted to 358,000 fine ozs., valued at £1,520,000. The decrease, as compared with the corresponding period of last year, is 14,000 ozs.

The London circular of Pixley & Abell, dated Aug. 12, gives the exports of silver to the east from Jan. 1 to Aug. 12, as compared with the corresponding period of last year, as follows:

|                          | 1909.      | 1908.      | Dec.       |
|--------------------------|------------|------------|------------|
| To India . . . . .       | £3,841,800 | £5,313,753 | £1,471,953 |
| To China . . . . .       | 1,465,700  | 516,400    | *949,300   |
| To the Straits . . . . . | 82,800     | 90,510     | 7,710      |
| Total . . . . .          | £5,390,300 | £5,920,663 | £530,363   |

**TORONTO MARKETS.****Metals.**

Aug. 24.—(Quotations from Canada Metal Co., Toronto).

Spelter, 5 1-4 to 5 1-2 cents per lb.; (market strong).

Lead, 3.40 to 3.50 cents per lb.

Antimony, 8 to 9 cents per lb.

Tin, 31 3-4 cents per lb.

Copper, casting, 13 3-4 cents per lb.

Electrolytic, 13.75 cents per lb.

Ingot brass, 9 to 12 cents per lb.

Aug. 24.—**Pig Iron**—(Quotations from Drummond, McCall Co.)

Summerlee, No. 1, \$24 (f.o.b. Toronto).

Summerlee, No. 2, \$23.50 (f.o.b. Toronto).

Midland, No. 1, \$21.50 (f.o.b. Toronto).

Coal:

Anthracite, \$5.50 to \$6.75.

Bituminous, \$3.50 to \$4.50 for 1 1-4 inch lump.

**Coke.**

Aug. 23.—Connellsville coke, f.o.b., ovens:—

Furnace coke, prompt, \$1.60 to \$1.70 per ton.

Foundry coke, prompt, \$1.85 to \$1.90 per ton.

Aug. 23.—Tin (Straits), 30.60 cents.

Copper, prime Lake, 13.37 1-2 to 13.50 cents.

Electrolytic copper, 13.00 to 13.10 cents.

Copper wire, 15.00 cents.

Lead, 4.40 to 4.45 cents.

Spelter, 5.70 to 5.80 cents.

Sheet zinc, 8.00 cents.

Antimony, Cookson's, 8.62 1-2 cents.

Aluminum, 22.50 to 24.00 cents.

Nickel, 40.00 to 47.00 cents.

Platinum, \$24.00 to \$26.00 per oz.

Bismuth, \$1.75 per lb.

Quicksilver, \$43.00 to \$43.50 per 75-lb flask.

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|-------------------|---------------------|-------------------|
| Aug. 6 . . . . .  | 50 7-8              | 23 1-2            |
| Aug. 7 . . . . .  | 50 7-8              | 23 1-2            |
| Aug. 9 . . . . .  | 50 7-8              | 23 1-2            |
| Aug. 10 . . . . . | 50 7-8              | 23 1-2            |
| Aug. 11 . . . . . | 51                  | 23 1-2            |
| Aug. 12 . . . . . | 51                  | 23 1-2            |
| Aug. 13 . . . . . | 51 1-8              | 23 9-16           |
| Aug. 14 . . . . . | 51 1-8              | 23 9-16           |
| Aug. 16 . . . . . | 51 1-8              | 23 9-16           |
| Aug. 17 . . . . . | 51 1-8              | 23 9-16           |
| Aug. 18 . . . . . | 51                  | 23 1-2            |



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The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals and extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite ; copper in sulphide and native form ; gold, mostly in free milling quartz ; silver, native and in other forms ; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The allied metal, cobalt, is also found in Ontario in unsurpassed quantities.

The output of iron, copper, nickel, silver and cobalt in 1906 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

**HON. FRANK COCHRANE,**

Minister of Lands, Forests and Mines,  
**Toronto, Canada.**

# PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are : Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc ; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows :

All mines belong to the Government of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unsurveyed territory, is open to prospecting.

**Miners' Certificates** good for a calendar year may be obtained by sending \$10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minimum being 40 acres in unsurveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of \$10.00 plus a yearly rental of \$1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed

territory may be purchased as a mining concession at the price of \$20.00 per acre if within 20 miles of a railway in a straight line, or \$10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

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Copies of the Mining Law and any information can be had on application to

**The Hon. Christopher Chisholm**

Commissioner Public Works and Mines,

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Every one interested in the mineral industry of Canada should have a copy of those books in their library.

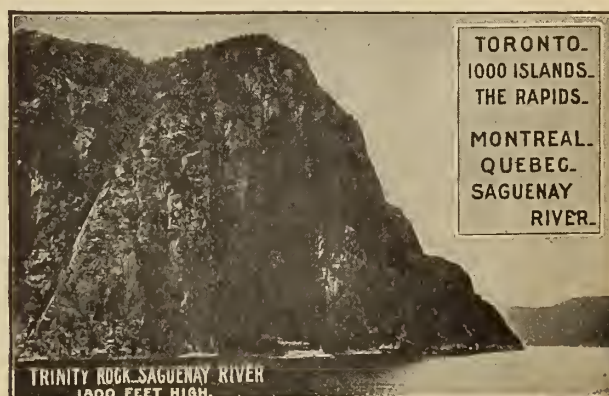
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The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was \$5,579,300, the Lead Output 52,408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

**HON. MINISTER OF MINES**

**Or WM. FLEET ROBERTSON, Provincial Mineralogist, VICTORIA, B.C.**

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Manufacturers of

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(Acid Open Hearth System)

**Switches and Track Work**  
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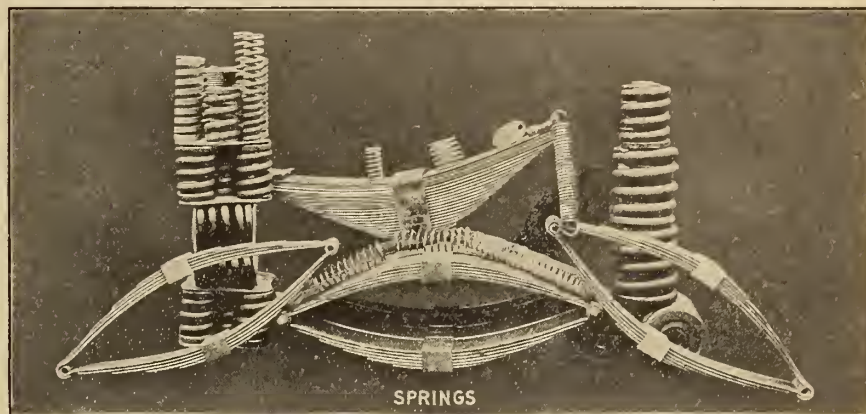
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of all kinds

**Manganese Steel Castings**

for wearing Parts, insuring Great  
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**INTERLOCKING PLANTS**  
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Westinghouse Mine Motors are noted for great strength of parts, large self-oiling bearings that seldom need attention, large overload capacity, low operating temperature and high efficiency.

We illustrate a Westinghouse Induction Motor driving a Deep Mine Sinking Pump. Westinghouse Alternating and Direct Current Motors are fully described in Circulars 1068 and 1118; ask for copies.



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Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.

### NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

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Is only one strength, if anything, a little stronger than 50% Dynamite. It does not freeze, or rather, explodes with perfect efficiency when frozen and needs no thawing.

### "AUTUMN BRAND" DYNAMITE

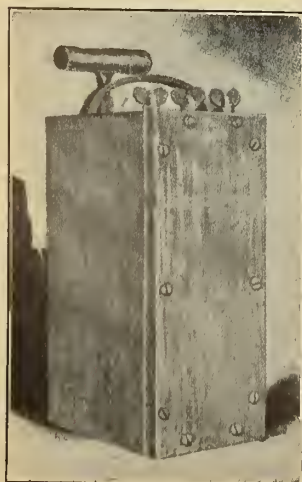
Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

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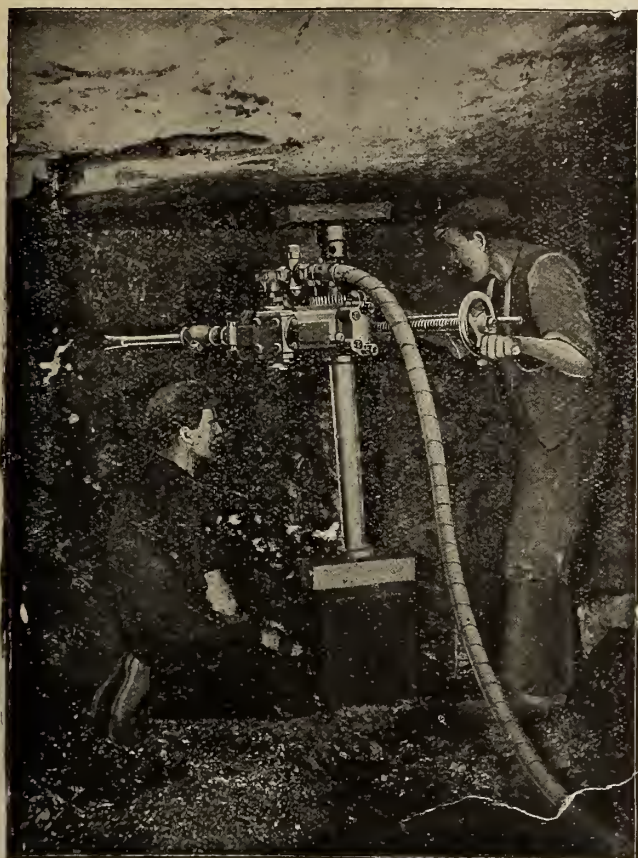
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Three Post Magneto Electric Blasting Machine

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## The "Little Hardy" Coal Cutter

Holes at Floor Level or Roof Level or in any intermediate position in Coal or Dirt Band, &c.

Equally suitable for Holing and Shearing.

The Lightest Coal Cutter in the Market.

Nearly 700 Machines at work. 93 in use by one Canadian Company.

## The Hardy Simplex Hammer Drill

Weight 22 lbs. Bores 6 ft. Deep.

Automatically Rotates the Drill Steel and lows out the Cuttings  
FOR SINKING, &c.

**SOLE MAKERS**

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Stocks of these machines kept by Messrs. A. C. Thompson  
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THERE ARE OTHERS, BUT WE KNOW

## "Cleveland" Stoping Drills

Will give you the best results of all. If you are skeptical, give us shipping directions, and we will send you one on 30 days' trial, so you can

## Find Out What They Will Do

in your own mine,—or better still, buy one machine and keep a record of amount of Drilling, time laid up for repairs and cost of repairs, (if any) and then compare these records with similar ones kept of any other stoper. If you will do this, we feel sure that when you are ready to order more equipments

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**The Canadian-Cleveland Drill Co., Ltd.**  
Cobalt, Ontario.

ROCK DRILLS, PNEUMATIC TOOLS, HOSE, DRILL STEEL, ETC.





See Bulletin X 22

Jeffrey Electric Locomotives are built in sizes from one to thirty tons in weight—operated either from trolley wire or storage battery attached to Locomotive. Applicable for any industry in which it is necessary to move cars

Send for Bulletin X 15

## The Jeffrey Mfg. Company Columbus, Ohio, U.S.A.

CANADIAN OFFICE and WORKS  
MONTREAL

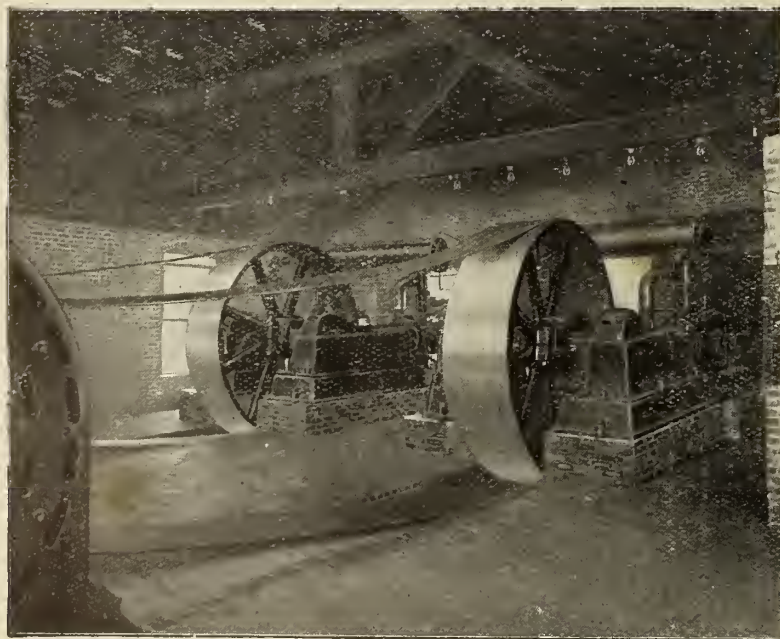
## JEFFREY Coal Tipples and Wire Cable Car Hauls

in design, building construction and mechanical equipment embody the latest and most successful devices in practice.

**We build  
Complete Coal Mine and Tipple  
Equipments**



See Bulletin X 21



An installation of Sullivan Class "WJ" Compressors, driven by belt from electric motors.

## Sullivan Air Compressors

Mining Companies which have electric or water power available can secure air power upon the most reliable and economical terms by installing Sullivan "WJ" duplex belt driven compressors.

These machines are equipped with heavy duty frames, bath lubrication of main working parts, and two stage air cylinders with large intercooling areas.

CATALOGUE 1358

**Rock Drills, Hammer Drills  
Diamond Drills**

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CONCENTRATES

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*Printing a Specialty.*

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## Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.

**To Date 34 Lives Saved by Its Use**



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**EXPLOSIONS  
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The latest model: Helmet fitted with Electric Head Light.

**Agent: RICH. JACOBSON**

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**"Little Giant"**

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☐ Built in sizes ranging from 2" to 5½" Cylinder diameter, for all work from boulder breaking to submarine drilling.

☐ Our claim that the Rand drill is the best in the market is proven by the sale of more of this type than of all other makes combined.

☐ Prices and catalog on request, or ask to have one of our representatives call.

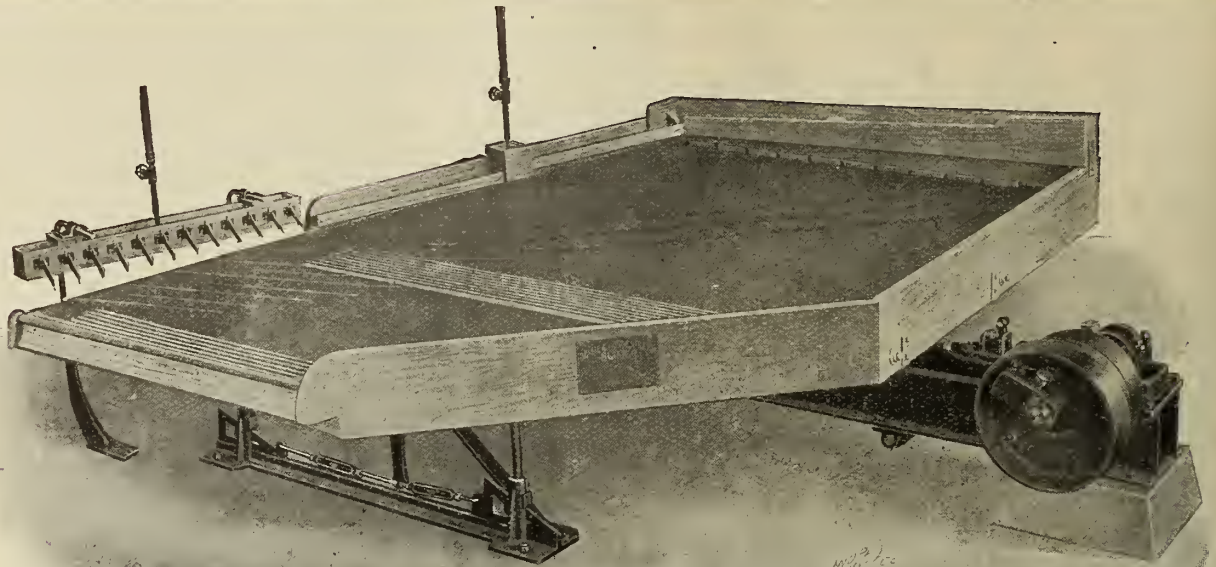
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## The Improved No. 3 Deister Slime Table

Is another step forward in the concentration of slimes. Embodying the same general principles as our No. 3 table, the improved mechanical construction has enabled us, in actual mill operation, to make a greater saving with less attention and repairs.

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ESTABLISHED, 1867

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PAID-UP CAPITAL \$10,000,000      REST \$6,000,000

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The new Travellers' Cheques recently issued by this Bank are a most convenient form in which to carry money when travelling. They are issued in denominations of

**\$10, \$20, \$50, \$100 and \$200**

and the exact amount payable in **Austria, Belgium, Denmark, France, Germany, Great Britain, Holland, Italy, Norway, Russia, Sweden and Switzerland** is stated on the face of each cheque, while in other countries they are payable at current rates.

The cheques and all information regarding them may be obtained at every office of the Bank.

Branches at **Cobalt, Elk Lake, Cowganda, and Latchford** in the silver mining camp of New Ontario and throughout Canada; also in the United States and England.

## The Canadian Laboratories

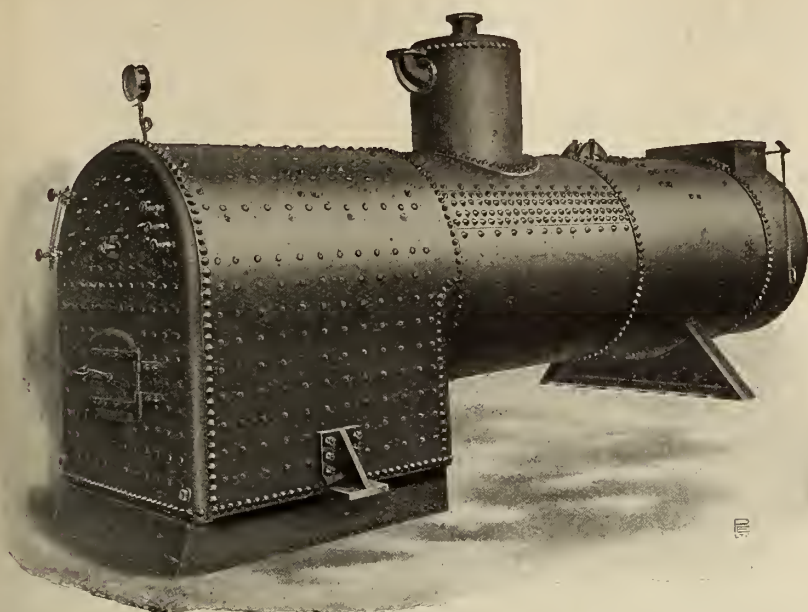
Chemical and Physical tests  
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Write for prices for  
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BOILERS ON STOCK WITH  
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**THE GOLDIE & McCULLOCH CO., LIMITED**  
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# Allan, Whyte & Co.

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For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. **SPECIALLY FLEXIBLE ROPES** for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. **SPECIAL ROPE FOR LOGGING.**

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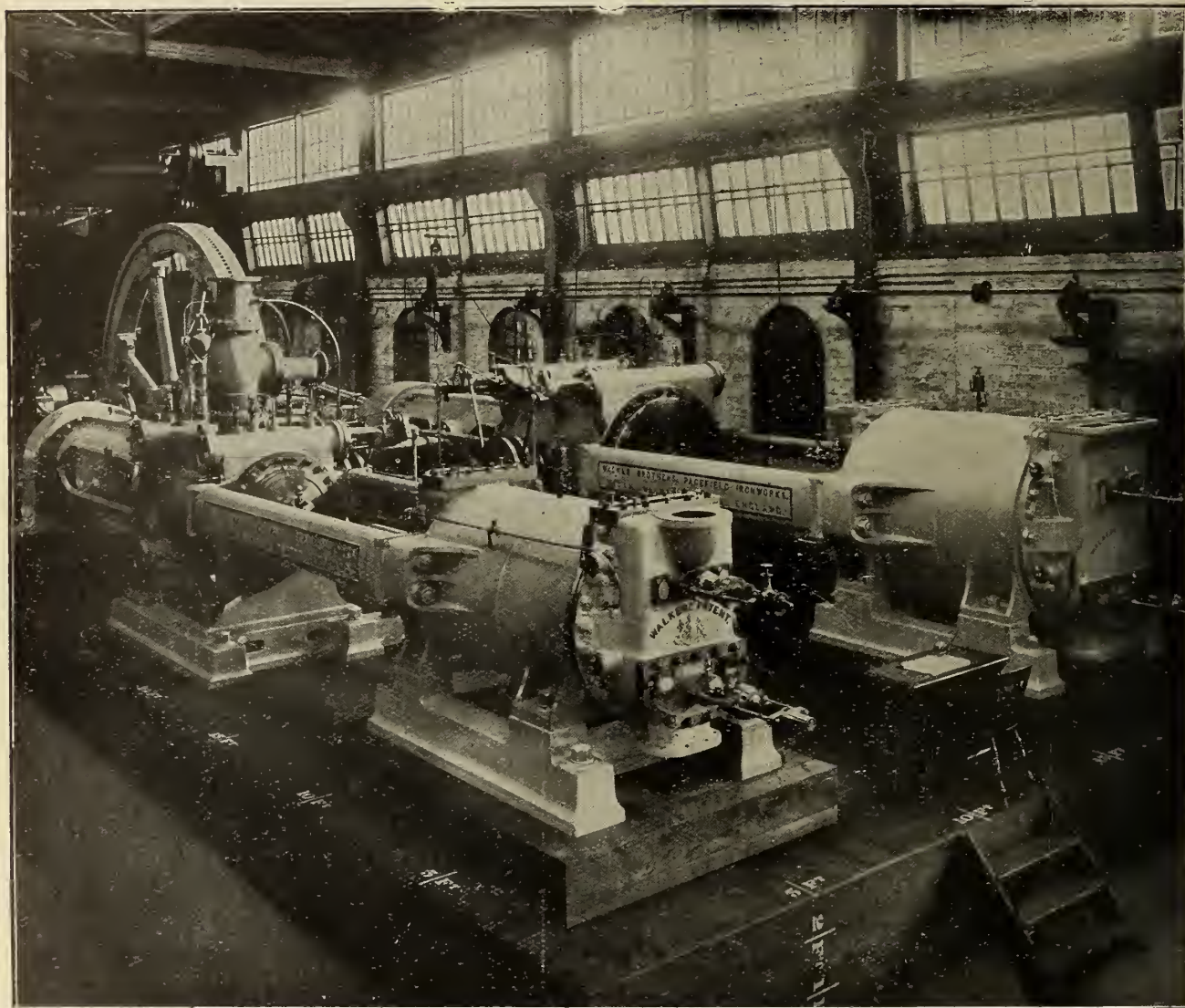
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**CRUSHING AND GRINDING MACHINERY**  
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is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

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CORRESPONDENCE SOLICITED.

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**Engines, Air Compressors**

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**Standard Diamond Drill Co.**

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Manufactured By

THE

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Works, Valleyfield, Quebec

## MILLING AND MINING MACHINERY

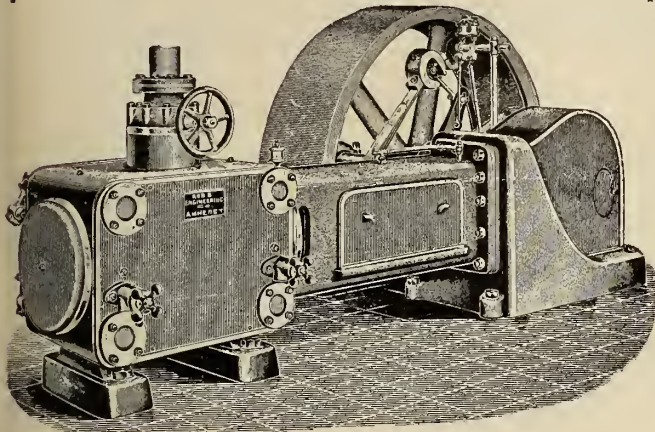
Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

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### Engines

Corliss,  
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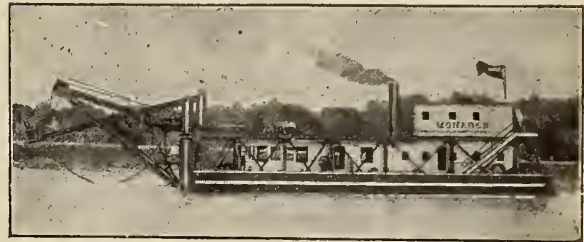
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**Dredges, Ditchers, Derricks,**

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Steel Skips, Clam-Buckets,  
Coal and Concrete Tubs,  
and other Contractors' Machinery.

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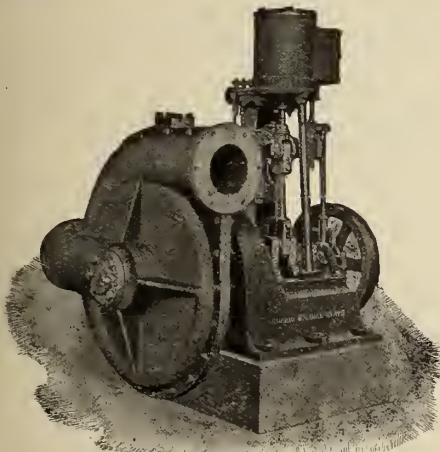
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Centrifugal Pumping Machinery for various Industrial Purposes

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## STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

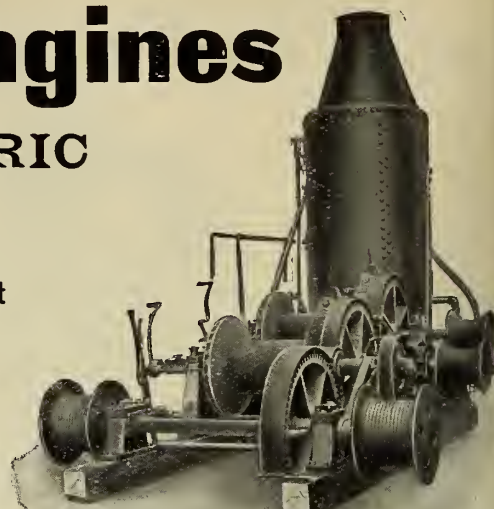
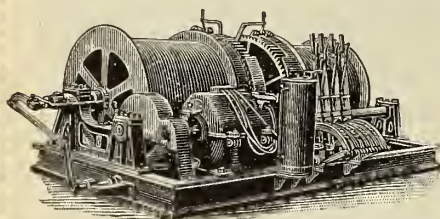
The **FLORY CABLEWAY SYSTEM** is Superior to any on the Market

**Slate Mining and Working Machinery**

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MAY PROVE THE SOLUTION.

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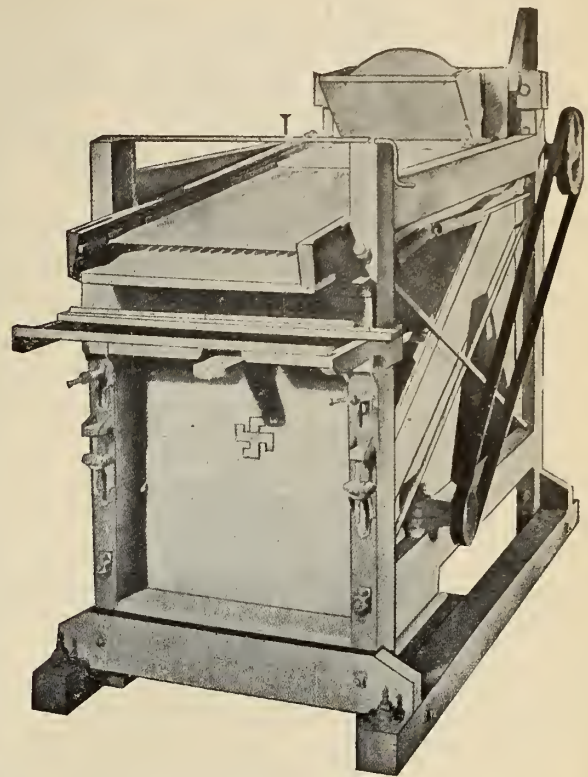
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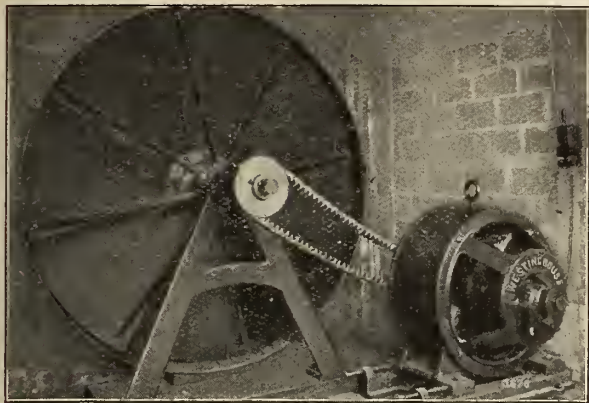
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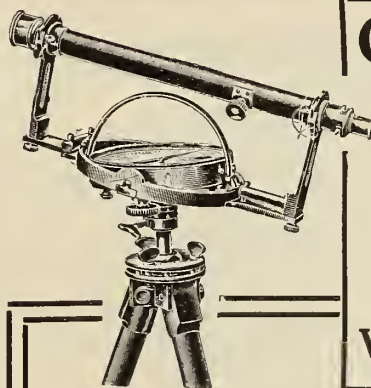
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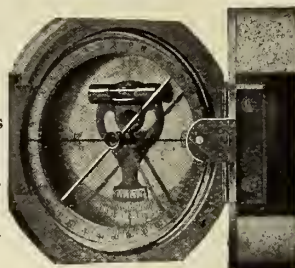
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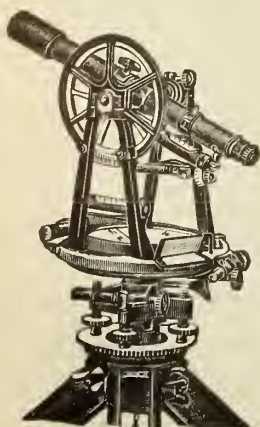
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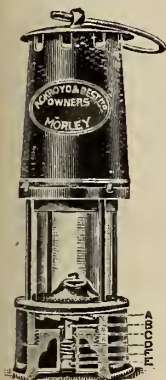
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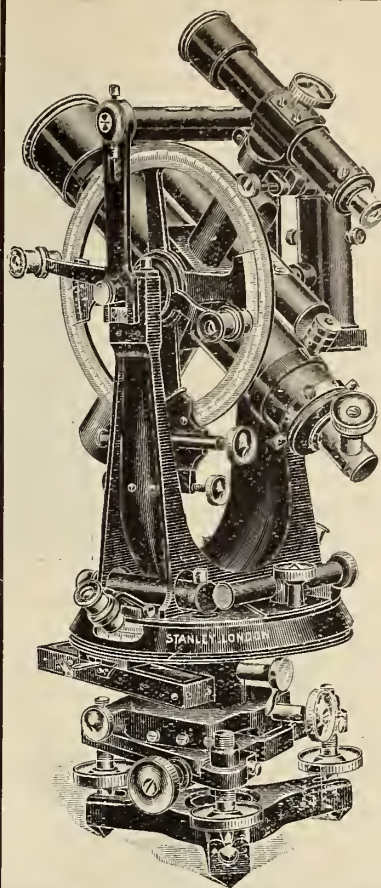
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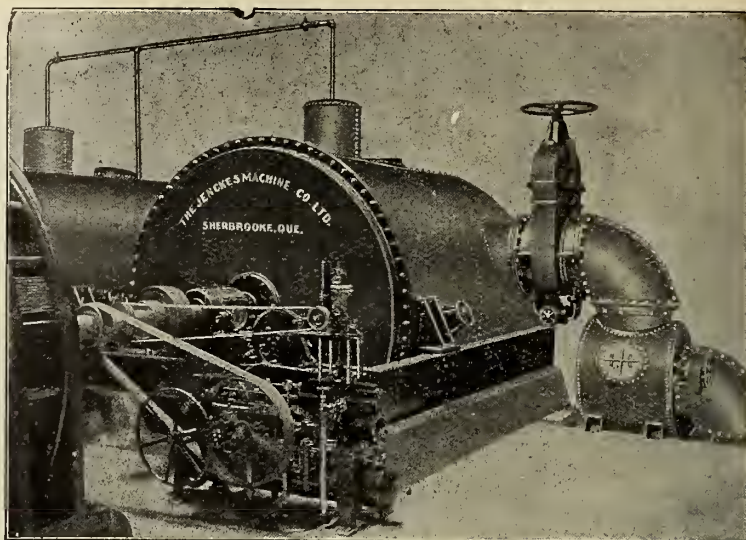
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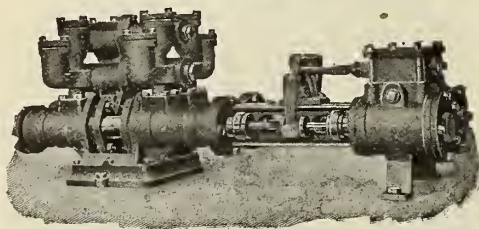
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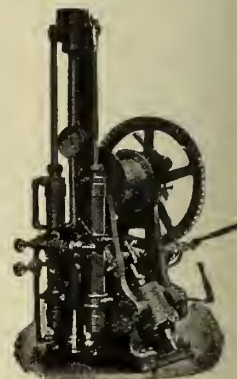
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, September 15, 1909

No. 18

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the  
**MINES PUBLISHING CO., LIMITED**

**Head Office** - Confederation Life Building, Toronto.  
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**Editor:**  
J. C. MURRAY, B.A., B.Sc.

**SUBSCRIPTIONS**—Payable in advance, \$2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, \$3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

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### WESTERN COAL.

Canada is entering upon a new phase of extension. That reciprocity in coal between the United States and the Dominion is a live question, is merely one indication of the growing strength of our country. That it has been discussed at all is due to several causes, principally to the fact that Alberta and British Columbia have practically a monopoly of high-grade coal in the west.

The rapid exploitation of our western coal areas is, therefore, a matter of national moment. And since coal-mining is not a poor man's game, a plentiful supply of capital is a pre-essential. Also, for the good of all concerned, it is desirable that initial mistakes be avoided. Coal is, more or less, a public utility. The ownership of the western deposits is vested in the Canadian public, and it is appropriate that the Canadian public should follow intelligently the steps that are being taken to open up some of the most important fields in Alberta.

The latest and perhaps the most significant happening in Albertan coalfields is the amalgamation of the interests of the German Development Company with those of the Canadian Northern Railway. This is an event that will have far-reaching effects. A glance over the railway map will be sufficient to justify the assertion that this alliance gives the Canadian Northern a most advantageous position. Possibly it brings in their hands the control of a considerable proportion of the bituminous coal supply available for railway use in Alberta.

The amalgamated interests are represented by two recently incorporated companies. "The Rocky Mountain Collieries, Limited," and "The Brazeau Collieries, Limited." The property of the first-named company is situated a few miles south of the main line of the C. P. R., where this line enters the Rockies, and where, up to now, the inadequate supply of steam coal shipped from Canmore had to be supplemented by fuel from Crow's Nest Pass. The coal lands controlled by "The Brazeau Collieries, Limited," comprise the areas belonging to the German Development Company, on the Brazeau, Bighorn, and Saskatchewan Rivers, along with the properties of Mackenzie and Mann on the Brazeau and McLeod Rivers.

Doubtless, the Brazeau lands will be worked for the particular benefit of the Canadian Northern Pacific. The coal here, according to the results of careful investigation, is a high-grade bituminous fuel. And it exists in vast quantity. The areas to be worked by "The Rocky Mountain Collieries, Limited," will become more valuable when the Mackenzie and Mann

line from Edmonton through Calgary to the Boundary country shall have been completed.

It is restful to observe that neither of the above concerns is to be put on the market as a public flotation. In both, foreign capital is heavily interested. Both, also, have been projected only after long investigation by and consultation with qualified coal-mining engineers, and geologists.

We are informed that both properties are to be opened up at once. Competent authorities have been engaged to advise upon means and methods, and early blunders, irreparable in the later life of a mine, are being sedulously avoided.

Whether success or failure attend the future history of this projects—and we have little reason to expect anything but success—they are bound to loom large in the commercial economy of the West. Especially interesting to Canadian coal mine operators will it be to watch the manner in which development proceeds.

### PUBLICITY.

Canadian newspapers have much to learn as regards the meaning and value of the mining industry. The great majority of our dailies either ignore the industry completely or publish sensational clap-trap.

Yet there is a growing number of newspaper men to whom mining means more than the stock market. We have noted before the enterprise of the British Columbian dailies. Several of these publish daily columns of mining news. The statistics of ore production appear in a number, and full publicity is given to mining concerns new and old. Naturally there is a fair sprinkling of unreliable news. This, apparently, is inevitable. But the total amount of such stuff appearing in B. C. papers is creditably small. One feature that is distinctly pleasing is the annual review that comes out promptly at the end of the year in several of the more progressive western journals. And it is by no means invidious to mention here the excellent work of Mr. E. Jacobs, of Victoria, secretary of the Western Branch of the Canadian Mining Institute, and a valued contributor to the leading mining journals of the Empire and the United States. Mr. Jacobs possesses a passion for accuracy and a fearlessness that have become almost proverbial. His contributions to the press have given his Province wide advertisement, and have demonstrated not only the value of accuracy and honesty in these matters but have shown the futility of exaggeration.

But, with few exceptions, eastern newspapers give little or no space to mining. Stock-gambling is encouraged. Inspired news-notes touting mining properties are rarely refused. Generally, the reading public learns nothing of what is being done in mining and smelting from the daily papers.

We have stated that there are exceptions. These are to be found, not in the larger cities, but at or near

mining centres. In Eastern Quebec one paper devotes regularly a fair proportion of its space to recording the doings at the mines within its field. In Western Ontario three or four journals do what they can to keep public interest alive. But in the Maritime Provinces only spoadie attempts are made in this direction.

Considering this condition, it is to be regretted that the Geological Survey of Canada no longer issues press bulletins. These could be made an invaluable medium of publicity. Moreover, the Boards of Trade in our mining towns are neglecting their opportunities. The publicity departments of our railroad organizations pay more attention to the sportsman than to the miner and prospector, although it is patent that a well-conducted campaign to advertise our untouched mineral lands, to direct and instruct the rising generation as regards the possibilities of the mining industry, would bring infinitely larger results in the long run.

We shall not cease to keep before our readers the issues touched upon above. But we must frankly deplore the indifference of the press and of the transportation corporations, and the inertness of other organized bodies. We have yet to develop a national spirit of co-operation.

### A CHANGE OF HEART.

Mr. Eugene Coste's recent paper dealing with the origin of petroleum has been the subject of much comment. Mr. Coste himself has received letters from a large number of prominent geologists and others. These letters afford the clearest evidence that modern geologists no longer think it a crime to question the theory of the organic origin of petroleum. Indeed there is ample indication of a change of heart on the part of not a few.

It has been our privilege to read a number of the letters received by Mr. Coste. A few quotations will show how the "inorganic" theory is gaining ground.

One officer of the United States Geological Survey writes thus: "While I am not prepared at this time to accept the universal application of this theory, especially in the Appalachian regions, I recognize that on a number of important points it has placed the burden of proof upon believers in the organic origin." This last assertion shows certainly that Mr. Coste has made progress.

In another letter a sidelight is thrown on the subject by the operator of a quicksilver mine in Oregon. "The deposit," he writes, "has been pronounced by geologists a distinct product of solfatoric action, and the very frequent occurrences and constant association of so much carbon would seem to bear out your very reasonable and logical theory of the volcanic origin of the petroleum series of hydrocarbon compounds."

Again, in a communication from another Survey official, the intimate association of oil with igneous bodies is mentioned. In this case the writer states that



he has collected several hundred instances of the association of oil with igneous rocks.

One territorial geologist makes a suggestion to the effect that volcanoes and explosive earthquakes have a direct connection with petroleum. "The immense volume of smoke emitted at times suggests the presence of volatile hydrocarbons, fluid or gaseous. . . . Explosive mixtures of air and gas may account for many earthquakes. I am inclined to the view that volcanoes are the results rather than the cause of petroleum. . . . We cannot exclude water and steam as active agents in vulcanism; but we must admit the powerful agency of explosive mixtures of gas and air."

A distinguished Mexican geologist alludes to the immense practical importance of a clear understanding of the "inorganic" theory in developing new fields. He heartily endorses Mr. Coste's position.

After reading more than a score of letters of this kind, one is led to believe that the tendency amongst our leading geologists is to accept more fully the theory of which Mr. Coste has been so ardent a supporter. This is a matter of no little importance, in view of the fact that the industrial world is becoming every day more dependent upon petroleum and its products. It bears directly upon the exploitation of our petroleum and gas fields.

Incidentally it must be most gratifying to Mr. Coste, who for some years has played a lone hand, to find that his supporters are becoming more numerous every day.

### MEXICAN INSTITUTE OF MINING AND METALLURGY.

Bulletin No. 1 of the Mexican Institute of Mining and Metallurgy (Instituto Mexicano De Minas Y Metalurgia) has just been received. It is a most commendable production.

Mexican cyanide practice has set a standard for the world. In the United States cyanidation is admittedly less advanced than in the southern republic, and, on the Rand, Mexican practice has been copied.

Hence it is with especial pleasure that we observe that two of the three papers included in Bulletin No. 1 treat of cyanidation. The first of these two, "A Proposed New System for the Cyanide Treatment of Slimes," is reprinted in this issue of the Canadian Mining Journal. The second, "Cyanidation of Concentrates," is a suggestive synopsis of a paper by A. Goothe.

The proceedings and papers are printed both in Spanish and English. This duplication of languages should be highly educative. The Canadian mining student must acquire a knowledge of Spanish if he is to become a well-rounded mining man. The Bulletin of the Mexican Institute will prove an invaluable aid in this.

The Canadian Mining Journal wishes the newly organized society a vigorous and prosperous life. Its

objects are wholesome. It has made a good start.

We may express here the hope that close relations may be established between the Canadian Mining Institute and its sister society. Prosit!

### SILVER COINAGE.

Throughout Canada the silver coins of the United States are accepted at par. On the other hand, except in towns near the international boundary, Canadian coins are either refused in the United States or accepted at a large discount.

There is a Canadian law providing for the deportation of United States coins. Apparently this law is inoperative. Why it should be, we do not know. But it is obvious that until this is made effective, the Royal Mint at Ottawa cannot make headway. The seignorage on coining silver is large, because of the disparity between the face value of silver coins and their actual worth as silver. With a large output of silver coins, the Royal Mint would pay handsomely. There appears to be little reason why our whole demand should not be supplied from Ottawa. It is certain that with a sufficient Canadian coinage much of the United States silver now in circulation here would be displaced.

### EDITORIAL NOTES.

The sixth general meeting of members of the Western branch of the Canadian Mining Institute was opened at Nelson, B.C., on September 25. The Council of the Branch, having accepted the invitation of the American Institute of Mining Engineers to adjourn to Spokane, will join that body's discussion and proceedings there.

The Sheep Creek gold camp, a few miles east of Rossland, is giving promise of wealth. The camp is yet in its infancy. But substantial working profits have been made in small stamp-mill operations, and there is sound reason to cherish the expectation that Sheep Creek will have a prosperous life. Transportation of ore will be facilitated by the construction of a Government bridge across the Columbia River at Rock Creek. It is possible, also, that electric power will be furnished within a reasonable time.

The flow of European capital to Alberta and British Columbia is heavy. Heavy investments in coal and timber lands are the order of the day. Heretofore United States capital has preponderated in new investments. Now, however, British, French, and German investors are most active. Two or three late mining transactions can be traced directly to interest aroused by the excursion of the Canadian Mining Institute last year.

# A PROPOSED NEW SYSTEM FOR THE CYANIDE TREATMENT OF SLIMES.

By Ferdinand McCann, Mexico, D.F.

(From the bulletin of the Mexican Institute of Mining and Metallurgy.)

(July Meeting, 1909.)

Having lately visited various cyanide plants in the Republic while gathering data for the book which I have just published on the subject, I was greatly interested by the almost perfect settlement of slimes performed by the Dorr Continuous Slime Thickener installed at the San Rafael Mill in Pachuca, and it occurred to me that by extending the field in which this apparatus is at present employed, an entirely new system of cyanide treatment of slimes might be devised.

The elaboration of this idea has resulted in the following proposal of a system which I will call be Dilution System, in contra-distinction to the Decantation System of Slime treatment. This system consists in the establishment of a series of slime thickeners, following the agitation tanks, with a dilution of the thickened pulp as it enters each successive thickener.

The apparatus which I would recommend for the purpose is the Dorr Continuous Slime Thickener, or any apparatus acting on the same principle, not only on account of its marked superiority over cones and spitzkasten as a settler, but also on account of the fact that the tanks and agitating apparatus used in the present installations of mechanical agitation in flat bottom tanks, could by very slight modifications be used as thickener tanks, so that the cost of the conversion of a decantation plant into a Dilution plant would be small.

The advantages which I believe may be obtained by this new treatment over the decantation treatment are:

A. Less cost of installation, as less tanks are required.

B. Less time required in the treatment, with a consequent increased capacity for a plant already installed.

C. Less labor, as the manipulation of the decantation pipes is entirely eliminated.

D. Less values in the solution that is discharged with the tailings, with consequent increased extraction.

E. The same bulk of solution to be precipitated.

The advantages which may be obtained by this installation in connection with a plant, practising mechanical agitation in flat bottom tanks, with semi-decantation and filtering, comprise those mentioned under headings A, B, C and D, and in addition, there would be:

F. Greater capacity and efficiency for the filtering plant.

The disadvantages in such a plant would be that:

G. A greater bulk of solution would have to be precipitated.

The advantages and disadvantages with plants using "Pachuca" tanks would be those mentioned under headings D, F and G.

## Method of Working the Dilution System.

In order to explain the working of this system let us assume that we have an ore assaying 500 grams of silver per ton, which has been slimed in the ordinary manner and introduced into an agitation tank in proportion of 50 tons dry slimes to 150 tons of solution con-

taining 0.3 per cent. KCy, and that the pulp thus formed is agitated continuously for 48 hours. We can assume, according to results obtained in Pachuca by continuous agitation, that at the end of that time, a washed and dried sample of the slimes will assay 70 grams of silver per ton, so that the 150 tons of solution will contain 21,500 grams of silver dissolved from the ore, or 143 grams per ton of solution.

By passing this pulp through a Dorr Thickener we will obtain a thickened pulp containing 55 per cent. of moisture. Therefore we will have:

(1) An overflow of 89 tons of clear solution assaying 143 grams of silver per ton, and 0.3 per cent. KCy; and

(2) 111 tons of thickened pulp, containing 61 tons of the same solution.

By mixing this thick pulp, thoroughly, with 549 tons of barren solution; i.e. 9 tons of barren solution for every ton of rich solution contained in the thickened pulp; we obtain, as a charge for the second Dorr Thickener, a dilute pulp composed of 50 tons of dry slimes, mixed with 610 tons of solution assaying 14.3 grams of silver per ton.

From this second Dorr Thickener we obtain:

(3) An overflow of 549 tons of clear solution assaying 14.3 grams of silver per ton and 0.3 per cent. KCy; and

(4) 111 tons of thickened pulp, containing 61 tons of the same solution.

By mixing this thickened pulp with 549 tons of water and passing it through a third Dorr Thickener, we have:

(5) An overflow of 549 tons of clear weak solution assaying 1.43 grams of silver per ton and 0.03 per cent. KCy; and

(6) 111 tons of thickened pulp, which as it contains but 61 tons of solution assaying 1.43 grams of silver and 0.03 per cent. KCy, may be thrown away, as it will not pay to extract the values in solution by further handling.

The preceding statements regarding the cyanide contents in the various solutions does not refer to free cyanide, as of course a certain amount will have combined with the silver, etc.

The only precaution required in this treatment is that, in each dilution, there should be a perfect mixture of the thickened pulp with the diluent, as otherwise the dilution would be imperfect, and the thick pulp, in falling to the bottom of the successive thickener tanks, might carry undiluted solution enclosed within its mass.

This mixture might be performed by a centrifugal pump, receiving both pulp and diluent, and throwing them together into a bucket or other small receptacle, which would not only act as a mixing apparatus, but also enable the diluted pulp to overflow without much current into the successive Dorr Thickener.



### Treatment of the Solutions.

The solution (1) should be precipitated, while solution (3) might be partially precipitated, and partially used in the battery, collection—and agitation tanks. But as each 50 tons of ore require 549 tons of precipitated solution for dilution in the second Dorr Thickener, we can assume that we would have to precipitate 11 tons of solution per ton of ore treated. This is about the amount of solution precipitated in the decantation plants of the El Oro Mining and Railway Co., and the Dos Estrellas Company, before the installation of the filters, so that in this respect there is no difference between the two systems.

The question naturally arises as to what is to be done with the solution (5); as, if fresh water were used in each dilution, the bulk of solution in the mill would soon be too great to handle, and if the solution (5) were used over again, as a diluent to the treatment of the successive charge, it would assay 2.71 grams of silver and 0.057 per cent. KCy; after its third use it would assay 3.82 grams of silver and 0.081 per cent. KCy, etc.

This weak solution, after being used once or twice as a diluent, might be used in the battery and collecting tanks, and then its values could be precipitated before being used again as a diluent, in which way the silver values could be kept within reasonable bounds but the cyanide values creep up until equal to those of the strongest solution in use in the mill, which, with a 0.3 per cent. solution, would mean that with each ton of tailings discharged there would be a loss of 1.22 tons of solution containing 3.66 kilos of cyanide, thus making the cost of treatment rather high.

However by using a weak solution of cyanide throughout the mill, say 0.05 per cent. KCy, as is at present done in mills using the decantation process with filter attachment, the loss by this dilution treatment would be within commercial bounds, and would be much less than that sustained under the decantation treatment.

In case this practice were followed, the precipitated barren solution should only be used in dilution of the thick pulp entering into the second Dorr Thickener and the direction of pulp entering into the second Dorr thickener should be performed by adding solution (5) which overflows from the third thickener, so that the quantity of solution to be precipitated would remain more or less constant, in the quantity of 11 tons of solution per ton of ore treated.

### Application of the Process in Connection With a Filter Plant.

When the dilution system is installed in connection with a filter plant the third Dorr Thickener could be dispensed with, and the thickened pulp (4) from the second Dorr could be run direct to the filters, where, after filtering, it could be washed with the small quantity of water required to replace that discharged with the tailings, so to keep the bulk of the mill solution constant, as is at present done in practice.

The advantages of installing this system in connection with a filter plant would be that, on account of the pulp being thick, the cake would be formed on the filter leaves in less time, consequently increasing the capacity of the present filter plant installation; and also, that the values in the solution accompanying the pulp to the filter would be much less than those ordinarily contained, so that the losses which might occur through imperfect washing of the cake would be diminished.

This latter feature is of especial importance in installations where the ore is treated in "Pachuca" tanks, as in such installations the solutions which are filtered assay from 100 to 300 grams of silver per ton, according to the value of the ore treated, and consequently it is customary to wash the cake on the filter, first with barren solution, and afterwards with water; but even with this double washing the displacement of the rich solution is not perfect, as is evidenced by the fact that the tailings discharged from the filter sometimes carry solution assaying from 8 to 20 grams of silver per ton; so that at present the practice of collecting the wash water in dams, and reprecipitating is giving good results.

By the application of the diluting system, before filtering, the solution which is contained in the pulp delivered to the filter would be of such a low grade that the wash with barren solution in the filter might be unnecessary, as a simple water wash would probably extract all of the values in solution, so that the time occupied in filtering could be reduced one-third, with a resulting increase in the capacity of the present filter installation.

### Plant Required.

It is customary, in the decantation treatment of slimes, to consider that a tank 30 feet in diameter and 10 feet high is necessary for treating 50 tons of ore with 150 tons of solution, as if the pulp is thicker than 1 to 3 there will be very little settling and decantation, so that in modern installations for slime treatment by partial decantation and filtering counting on 4 days' treatment in the tanks, there are required from 24 to 27 tanks of this size for treating 300 tons of ore per day.

By the dilution system, as there is no decanting in the treatment tank, there would be no reason to prevent charging 100 tons of slimed ore with 140 tons of solution to each tank. Furthermore as the same extraction is obtained in 48 hours by continuous agitation as in 96 hours by the decanting and settling treatment, the tank capacity for a plant treating 300 tons of ore per day by the dilution system would be as follows:

3 Dorr Thickeners, or agitating tanks used as settlers to dewater the pulp from the batteries.

7 Agitating tanks, being one extra for the time lost in filling and emptying.

3 Dorr Thickeners for the first dilution.

3 Dorr Thickeners for the second dilution.

Making a total of 16 tanks, as against 24 to 27 for the same purpose in the partial decantation and filtering plant of the same capacity.

In the older decantation plants, which have no filters, the tank equipment required is much greater than that of the partial decantation and filtering plants above mentioned, as in addition to the agitation plant therein described, there is generally a system of final settling tanks, where the slimes remain for another, three or four days, so that there may be required from 20 to 30 more tanks of the same size for that purpose.

These settling tanks would be entirely replaced in the dilution system, by the installation of 3 Dorr Thickeners, for the third dilution, as the capacity of a 30 foot Dorr Thickener is about 100 tons of ore, contained in 222 tons of thickened slimes, and about 1,000 tons of clear solution overflow per day.

### Regulating the Quantity of Diluent.

It may appear that the regulation of the exact amount of diluent to be supplied to each thickener



would be a matter requiring extreme care and attention, but I believe that this would not be the case, as the only result of a slight variation would be that the solutions in the successive thickeners would carry more or less values, which could be regulated by the daily assays.

The Dorr Thickener works automatically, with very little attention, and would handle sudden changes without any trouble.

An easy way for the workman to judge whether the proper quantity of diluent were being added, would be for him to have two cans of different sizes, which he could place under the streams of thickened pulp and diluent passing into the centrifugal pump, to observe whether the cans were filled in the same time, and if not he could so regulate the valve of the diluent pipe that the time required to fill each can would be the same.

Assuming the specific gravity of the ore to be 2.7, that of the diluent to be 1.03 and the thickened pulp to contain 55 per cent. of moisture, the relative size of the cans required for a dilution of 9 of diluent to 1 of solution contained in the thickened pulp would be in the proportion of 6.87 to 1.

#### Intermittent Working of the System.

By the ordinary working of the dilution system, as soon as the assays have shown the extraction in any

tank to be satisfactory the pulp contained in that tank could be transferred to the first Dorr Thickener, by means of a centrifugal pump, leaving the tank to be emptied ready for the next charge.

But should it be desired, the plant might be arranged for the

#### Continuous Working of the System.

This arrangement like that of the "Boss" continuous amalgamation process, might have some advantages, and may be worth investigating. However it would probably need some special arrangement for transferring the pulp uniformly throughout the agitation tanks.

#### Conclusion.

I wish to state that my interest in the Dorr Thickener is purely a scientific one, and I would further state that I do not propose this system as one which has been proven, nor would I advise its installation without having proven it by a preliminary trial on a small scale.

I merely offer it as a suggestion to the various metallurgists practising cyanide treatment, in the hope that the application of the principles herein proposed may be of benefit to them in their work, and that I may be instrumental, to a slight extent, in the improvement of the present metallurgical practice.

## IRON ORE DEPOSITS OF NOVA SCOTIA.

Notes from Reports by Dr. J. E. Woodman, issued by the Mines Branch,  
Department of Mines Ottawa.

(Continued from issue of August 15th.)

Magnetite, hematite, limonite (or brown hematite), ankerite, and siderite are found in Nova Scotia, as are also the less common iron-bearing minerals, turgite, goethite, and sideroplesite.

**Magnetite.**—The Triassic trap magnetites of the province vary in iron contents from 68.33 per cent. to 35.25 per cent., an average of ten samples giving 55.13 per cent. They often contain some specular hematite. The altered hematites of the Nictaux-Torbrook and Clementsport basins, while highly magnetic, usually have a brownish or reddish streak. They should be classed for the most part with the Clinton red hematites; but such as have been sufficiently metamorphosed, like those of South Mountain, are true magnetites. An average of these western occurrences shows 42.32 per cent. iron. The pre-Cambrian magnetites of Cape Breton vary widely.

Magnetite in the Triassic trap is at times well crystallized in gas and gash cavities, and in most of the deposits it is coarsely granular to massive.

**Hematite.**—In Nova Scotia no high-grade specular deposits have yet been sufficiently explored to prove that they are of workable size. Such analyses as can be given are sample assays from veins only, or are from districts outside the scope of this report. The chief exception is the Barachois specular ore, small lots of which run to 66.66 per cent. The specular ores of Londonderry are in a class by themselves, in that they have a highly micaceous structure, but most often show a brown to brownish red streak, due to the percentage of

moisture. So far as can be determined, these ores contain, on an average, 67.44 per cent. iron.

The Clinton red ores in Nova Scotia are, next to the mixed ores of Londonderry, the most important. The typical Clinton ore in New York averages 44 per cent. The Leckie ore at Torbrook averaged 49.20 per cent. for a number of years. As delivered to the Londonderry furnace, the shell ore at the Wheelock mine, Torbrook, ran 42.74 per cent. as an average for 1906, and 44.05 for the first four months of 1907.

The somewhat similar ore at Arisaig varies much, largely owing to the percentage of silica. Some extensive beds are too low in iron and too high in silica to work at all, while others are fair, especially in the west. A general average of 54 samples of the eastern two-thirds of the district, by various analysts, gives 40.05 per cent. iron.

**Limonite.**—The limonites of the United States, as worked, range from 40 per cent. to 50 per cent. iron. A fair average is 47.90 per cent.

The important limonite deposits in Nova Scotia belong to two groups—the Londonderry series and contact pockets.

At Londonderry and Brookfield, the two localities considered, the iron contents vary within wide limits, depending not only upon the amount of impurity, but also upon the type of ore and degree of hydration. An average of many furnace runs at Londonderry gives 43.36 per cent. iron.

The Brookfield limonite, averaging thirty-seven



analyses of shipments to Londonderry, gave 46.62 per cent. At the Ferrona furnace the average was said to be 47.5 per cent.

**Siderite.**—Siderite, iron carbonate, the "white ore" of Londonderry, is an important constituent of the deposits of that locality. It is mixed with ankerite and limonite. Theoretically it carries 48.27 per cent. of iron. As mined it averages 35.06 per cent. The Londonderry siderite belongs to the magnesian sub-species sideroplesite.

**Ankerite.**—The formula for this mineral calls for 50 per cent. calcium carbonate, 21 per cent. magnesium carbonate, and 29 per cent. iron carbonate, or 14 per cent. metallic iron. It is usually mixed with varying amounts of siderite, sideroplesite, specular ore and massive limonite.

This variety is uncommon, and nowhere else than in the Cobequid Mountains is it of great importance in

carry an average exceeding 10 per cent. The limonites range from a low figure up to 23.02 per cent. silica. The Arisaig hematites are highly siliceous.

Alumina is rarely present in important quantity. Most often it is negligible.

Manganese is most irregularly distributed. The Torbrook ores carry only minute quantities. The Londonderry ores run from nothing to 2 per cent., a general average of all ores being about 0.506 per cent.

Titanium is practically absent. Analyses reporting its presence require checking.

Phosphorus is uniformly high in the bedded Clinton ores of the Silurian; sometimes high and sometimes low in the Triassic trap iron ores. The ores of South Mountain, Torbrook, give an average of 1.995 phosphorus. The average for the massive red hematite of the Leckie veins is about 0.992 per cent.; for the magnetic shell ore, 1.110 per cent.

### —GENERAL INDEX OF SYMBOLS.—

T. TRIASSIC SEDIMENTS

Op. CAMBROSILURIAN (PROOVCIAN)

Gr. GRAHITE

Cs. MILLSTONE GRIT

€. CAMBRIAN.

□ LIMESTONE (PLATE I)

LCs. LOWER CARBONIFEROUS LIMESTONE

M. MESUMA (GOLD BEARING SERIES)

△ DOLOMITE (PLATE I)

LCi. CARBONIFEROUS CONGLOMERATE.

PCi. GEORGE RIVER SERIES

○ IRON (PLATE I.)

D. DEVONIAN.

PC. UNCLASSIFIED PRE-CAMBRIAN

■ PITS AND SHAFTS.

S. SILURIAN

Tr. FINE TEXTURED INTRUSIVES

♣ IRON OCCURRENCES.

smelting iron. Hence a brief description of its appearance and fluxing qualities may not be out of place here.

When pure it closely resembles white siderite. It crystallizes in rhombohedrons, and in coarse specimens the surface of the rock is made up of numbers of intersecting rhombohedral faces. Weathered faces show cross-hatched lines, and are brown in colour. Since it contains iron, lime, and magnesia, it is useful as a flux, and at the same time contributes to the iron content of the furnace charge. At Londonderry it renders possible the use of limonite of lower iron value than would otherwise be serviceable; but it requires a larger proportion of ankerite than would be used if an ordinary limestone were employed, because of the low percentage of calcium carbonate.

**Impurities.**—Many of the Nova Scotian ores are high in silica. The magnetites of the Triassic trap

The contact deposits of limonite are everywhere low. The Londonderry ores, both brown and white, are practically free from it. The magnetites of Barachois give 0.03 per cent., and are thus of Bessemer grade. The Arisaig ores are uniformly high, an average of 36 analyses from the eastern two-thirds of the district giving 0.572 per cent.

**Sulphur.**—Of this deleterious substance there is little in most of the Nova Scotian deposits, while some ores run high locally.

**Pre-Cambrian.**—The pre-Cambrian mountain protaxis of Cape Breton, upon which the whole structure of the island is built, is not sufficiently well known to be subdivided accurately. In the survey of Robb and Fletcher which culminated in the series of one-mile-to-the-inch geological sheets issued by the Geological Survey in various years up to 1885, parts of this complex

are differentiated as upper pre-Cambrian, or the George River limestone series, the characteristic feature of which is a light coloured dolomitic limestone. So far as known, the iron ore of the pre-Cambrian occurs in these rocks. But a large part of the area occupied by the old mountain cores has never been surveyed or prospected in detail; and not only is it possible that the George River series may be far more extensive than is now supposed, but there may be bodies of ore in other subdivisions of the pre-Cambrian. Much geological work remains to be done in middle and northern Cape Breton, especially along the line of exploration for various useful minerals.

The iron ore of the George River series is in part hematite, sometimes apparently bedded, and in part magnetite. The latter is in places distributed in granules through dolomite, being here and there segregated in sufficient amount to form pockets, of no great promise in any so far discovered. In other localities are larger irregular accumulations, partly replacements of limestone, partly occupying fissures. These are massive ores.

The gold-bearing (Meguma) series, which occupies so large a part of the mainland of the province, contains no workable ores. A few deposits of small size are connected with isolated patches of lower carboniferous which overlie the older rocks. The known Cambrian, as indicated by fossil contents, is restricted to small portions of eastern and southern Cape Breton, and, so far as known, holds no ore, except in one place. In upturned limestones and slates near Barachois, Cape Breton, are specular and massive red hematite and siderite, roughly conformable with the stratification, and lying on both sides of a contact with lower carboniferous strata. They have not been sufficiently explored to indicate great size.

**Ordovician.**—This series, called Cambro-Silurian in earlier studies, occupies large and irregular areas in the northeastern portion of the mainland, in Antigonish County.

The ores now known are chiefly in the vicinity of Arisaig, and are bedded hematites. They are less regular than the bedded ores of the Silurian in size, composition, distribution and relation to the country rock.

**Silurian.**—In Antigonish County a large basin of Silurian at Arisaig holds a few beds of hematite parallel with the strata. In Pictou County are many veins, partly hematite, partly siderite, which will be considered in Volume 2.

The greatest development is in the west, in Annapolis County, and includes the most promising deposit in the province so far opened. This is the bedded hematite series of Nictaux and Torbrook, and a small but perhaps important area at Clementsvalle, of similar character. The former contains the only ore which has been proved to any considerable depth, having been cut with calyx drills at 620 feet on the Lean Hematite vein, and worked to approximately 340 feet on the Leckie vein, most of it below sea-level.

**Devonian.**—By far the most widespread ores are those of the Devonian, being found from eastern Cape Breton westward through the southern part of that island, through Guysborough and Pictou Counties and into Colchester and Hants Counties, the one north of Cobequid Bay, the other south. Indeed the westernmost occurrences are far into Cumberland County, along the south side of the Cobequid Mountains.

These ores are varied in their character. In parts, especially in Guysborough County, they are high-grade

specular hematites, but apparently in small detached bodies. In Colchester County are the Brookfield deposit and the Londonderry range. The former is an irregular lode of limonite, occupying the Devonian slates immediately below their contact with the lower carboniferous; but instead of lying along this contact the lens stands on edge, as it were, extending directly downward into the slates. The Londonderry zone of ankerite (lime-magnesium-iron carbonate) and limonite has been a centre of interest for many years, in part because of its almost unique character. The iron ore is an alteration from carbonates, the complete series being (1) limestone and calcareous quartzite, (2) siderite (iron carbonate), (3) ankerite, (4) hematite and limonite, the last itself passing through several stages. The location of the ore is a series of easily replaceable beds that have felt especially severely the mountain-building which has given the Cobequids their present character.

**Lower Carboniferous and Triassic.**—Iron ore deposits in the limestone (Windsor series) are not abundant, but the contact deposits of Bridgeville and Sunnybrae, Pictou County, are replacements of limestone at the contact with older rocks, the ore going only to a moderate depth. The contact presents an irregular, broken or zig-zag line, and the iron ore pockets, which are crescent-shaped in surface plan, occupy the apices of the limestone scallops.

Part of the deposit at Barachois, Cape Breton, is in lower Carboniferous conglomerate; and here and there, as north of Whyecomagh, small amounts of hematite occur in the so-called metamorphic series.

The Triassic has many small and isolated magnetite and hematite bodies in the trap, but few are of economic value, because of their limited tonnage.

Thus it will be seen that the iron minerals of Nova Scotia have a distribution as wide geologically as it is geographically. There is, in the province as a whole, a great amount of iron oxides, but only a small portion of the total number of occurrences will probably prove workable at any time on a scale which should command the attention of capital.

### Mining Policy.

**Cost of Labour.**—A cost sheet supplied by a large worker in iron ore in Nova Scotia gives the present wages for mining and quarrying as follows:—

|                                               |               |
|-----------------------------------------------|---------------|
| Quarryman or underground miner, per day.      | \$1.40—\$1.50 |
| Drillman .....                                | 1.75          |
| Ordinary fireman, per day .....               | 2.00          |
| Foreman, per month .....                      | 65.00         |
| Expert engine man and mechanic, per month.... | 75.00         |

This may be compared with Wabana—\$1.10 per day for unskilled labour, and \$1.50 for drillmen, up to May, 1907; at that time wages rose materially.

All these costs seem extremely low to a westerner, yet they are 25 per cent. higher than a few years ago. But while they may mean no less in annual savings to the labourer, owing to differences in cost of living, these low wages do make an item in favour of a low total cost of production of the ore in the province.

As against this item, however, must be set off several others. One is the small size and uncertainty of many of the deposits. Where they are large and permanent they may be uncertain, as at Londonderry; low in iron and high in silica, as at Arisaig; or moderately expensive to work, because of attitude and depth, as at Torbrook. Still, while costs as low as at Wabana or in the Lake Superior region cannot be expected, it should



nevertheless be possible to mine ore in a number of parts of the province not now producing, at an expense which meets market conditions; and the author believes that this will be found to be the case.

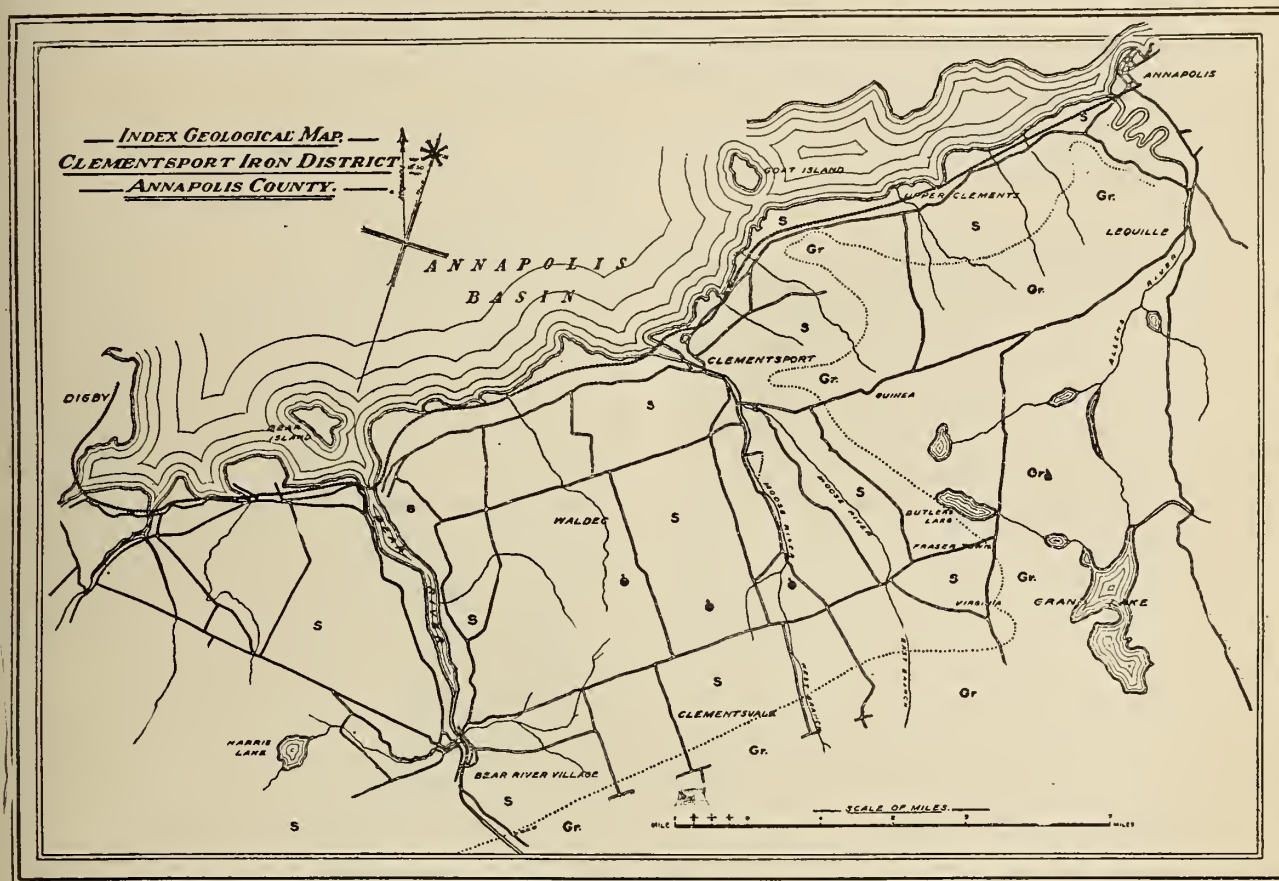
Some of the labour is unionized, much of it is not. It is difficult to secure or to keep a good quality of miners in this industry in sufficient numbers to meet even the present need. Metal mining of all sorts has been for some years conducted on so small a scale as to turn out few men who thoroughly understand the work. Imported labour has thus far proved more or less unsatisfactory. Indeed, of all the immigrants arriving at the port of Halifax every year, but a handful remain in the province of Nova Scotia.

**Capitalization.**—One of the most serious drawbacks to any success which might otherwise come to the iron industry of the country is the financial method em-

ployed, if, instead, the individual owners were to develop them and contract for sale of the ore to the smelters, if necessary attempting an understanding with one of the smelting companies whereby the latter supplies the tools in instances in which the owner has no capital upon which to work, even under the present market conditions a number of the isolated deposits could be profitably opened up. This plan is known to be feasible, because it is in practice to-day.

The wisest method for working the small deposits, then, is individual ownership and tonnage contract with the smelters. This is now employed by one of the companies for a considerable amount of ore each year.

**Smelting Centres.**—Mention has been made of natural geographic divisions into which the iron ore regions of Nova Scotia group themselves. Of these the eastern section requires little comment. There is no



ployed in certain instances by the owners of the land, holders of iron ore leases, middlemen, self-styled financiers and all concerned in the movement to boom a tract of iron ground.

Time and again have owners of land on which the iron ore was not reserved to the Crown held out for most exorbitant prices for territory not even properly explored, much less developed. If, instead of attempting to market these properties at unapproachable figures, serious effort were made to work them individually and to get what profit is possible while the ore lasts, more prosperity would result.

A large number of the iron ore deposits of the province are such, in extent and quality, that no ethical sanction can be gained for the practice of large capitalization. It is even an open question whether it would pay existing smelting companies to buy them up. But

immediate probability of any Cape Breton deposits developing to such size as to require or permit local reduction.

The east central division requires further study before much can be written about it. Some years ago a smelter was erected at Ferrona, in Pietou County, and the steel mills at Trenton, north of New Glasgow, later came to handle its pig. This furnace used Pietou County and Brookfield ores, which have proved to be local and limited; and on account partly of the development of its Bell Island deposits in Newfoundland, the Ferrona works were dismantled, and the large smelters at Sydney Mines erected by the Nova Scotia Steel and Coal Company. How much iron ore could be depended upon within the field outlined on the map as properly feeding this centre it is impossible to state without study subsequent to the preparation of this



volume. At present the only large deposit known is that of Arisaig, part of which would not pay to work under the present conditions of market and metallurgy. But the possibility must be kept in mind that in the future it may be feasible again to erect a plant in the vicinity of New Glasgow, where fuel and flux can be assembled with the iron ore at a minimum expense.

There remains consideration of the west-central and western regions. At present the former is drawing upon three sources—the Londonderry range, Torbrook, and, to a small extent, Brookfield. If the Clementsport ores should be found of sufficient grade upon proper exploration—which, by the way, they have never had—they are as suitable as Torbrook ore for the furnace, and of the same variety and characteristics. They are nearer Annapolis than is Torbrook, and they naturally become a part of any large proposition looking to the development of the western ores.

The Londonderry ores are difficult to work upon a sufficiently large scale, without the aid of Torbrook or some other deposit. The capacity of the latter remains to be seen, but it will be by far the largest in the province unless some new deposit of great extent be discovered. Speaking entirely impersonally, it seems as though Parrsboro offers a most suitable site for a plant of large size.

To it could readily be brought the ores from the whole western Cobequid range directly. Annapolis is, according to plans already on foot, to be a shipping port for the Nictaux-Torbrook field, and Clementsport would feed this as well. Brookfield is but eight miles from Truro, and with a Truro-Parrsboro railway, survey of which has been made and charter issued, it is within as easy reach of that town as of Acadia Mines (Londonderry) to-day. The Hants County deposits also would reach Parrsboro as easily as Acadia Mines.

Flux would come from the Londonderry range (ankerite) and from Hants and Colchester Counties, especially at and near Windsor (limestone). Fuel would come chiefly from Springhill, along the road over which most of the tonnage now goes, giving a short downgrade haul and avoiding the costly and round-about freightage across the Cobequid Mountains, now necessary on the Intercolonial Railway. The road from Springhill mines to Parrsboro crosses the mountains by a low pass, which involves no heavy grades. Should the buried western section of the Cumberland coal field be developed, there would be one or more additional sources of fuel at close range.

It is a large enterprise even under present conditions; but it appears as though it might be possible, and is worth investigating by capitalists. It is the only case of its kind in the province that would not require long and costly exploration of iron fields before being regarded seriously.

#### **Titles to Iron Ore—Systems of Holdings.**

**Two Systems.**—In Nova Scotia two systems obtain, under which iron ore is held as property. The situation, which is almost hopelessly involved in some localities, has been explained as clearly as is possible by the late Dr. E. Gilpin, Jr., Deputy Commissioner of Works and Mines of Nova Scotia (Mineral and Crown Land Grants in Nova Scotia; Trans. Roy. Soc., Can., vol. IX., 1903, pp. 123-134).

In some parts of the province title to the iron ore remains vested in the land; in others the iron is reserved to the Crown, and in certain districts both systems obtain, to the great confusion of titles. The exact condi-

tion depends upon the date of the original grant of land and the nature of the clause contained in it reserving certain minerals.

**Earlier Grants.**—In grants up to the year 1808 no reservation of iron ore was made by the Crown, but from that year onward reservation was a feature of the grants. "It follows, therefore, that, in many of the older township grants issued between 1759 and 1785, the Crown does not profit by the mining of this ore. This is notably the case in the grants of Guysboro, Londonderry, Nictaux and Clementsport, and in numerous large blocks of land granted to the Loyalists and early Scotch settlers in Antigonish, Pictou and Colchester Counties." In all of these, title to ore is vested in the land, and no royalty is paid to the Provincial Government on the ore.

In 1826 a royal grant was issued conveying to the Duke of York and Albany all the mineral rights of every description in the province, except those previously issued and in process of working. The rights were transferred to an organization in London, known as the General Mining Association, which kept them until 1858, at that time releasing to the Provincial Government of Nova Scotia all rights except those to certain tracts of coal land. Thus all rights to iron ore, except those to certain early grants, came under control of the province. These rights included those in ungranted lands, in lands granted between August 25, 1826, and the date of settlement in 1858, and in all iron reserved in lands granted previous to August 25, 1826.

**Acts of 1858.**—The acts of 1858, chapter 2, next came into force, reserving gold, silver, lead, tin, iron, coal, and precious stones, and leaving all other minerals unreserved. This continued in force until 1892, when all minerals, except limestone, gypsum and building material, became reserved.

**Cape Breton Island.**—In Cape Breton, while most of the iron ore is reserved to the Crown, some is not; and as the history of that country is most complicated, and is different in the early years from that of Nova Scotia, it is inadvisable to attempt here to explain the conditions. They can only be learned in the specific cases when attempt is made to get title to the ore.

**Records.**—In the office of the Department of Crown Lands in Halifax the grants are recorded in two series of books. One of these is numbered, the other lettered. In general it may be said that iron is reserved to the Crown in the grants which are labelled on the Department maps as referring for description to books designated by letter, and in the numbered books it is not reserved. More specifically, however, iron ore is reserved in those grants recorded on the maps as of books A to Z, except part of book R, and books 12 to 64.

The Crown Lands Office has maps and records only of the original grants. For all information regarding present ownership search has to be made in the various county registry offices, a slow and uncertain process. The system is by no means perfect. It is often difficult to discover the present ownership, or to find accurate maps or descriptions from which one can do his own surveying.

**Ownership and promotion.**—Taking advantage of the condition of ownership of such iron ore as goes with the land, a common method among promoters, in order to secure such title as will enable them to work off a sale at their own convenience, is to procure from the owners of the land an option, paying a small deposit, \$50 to \$100, the option binding the owner to sell at a

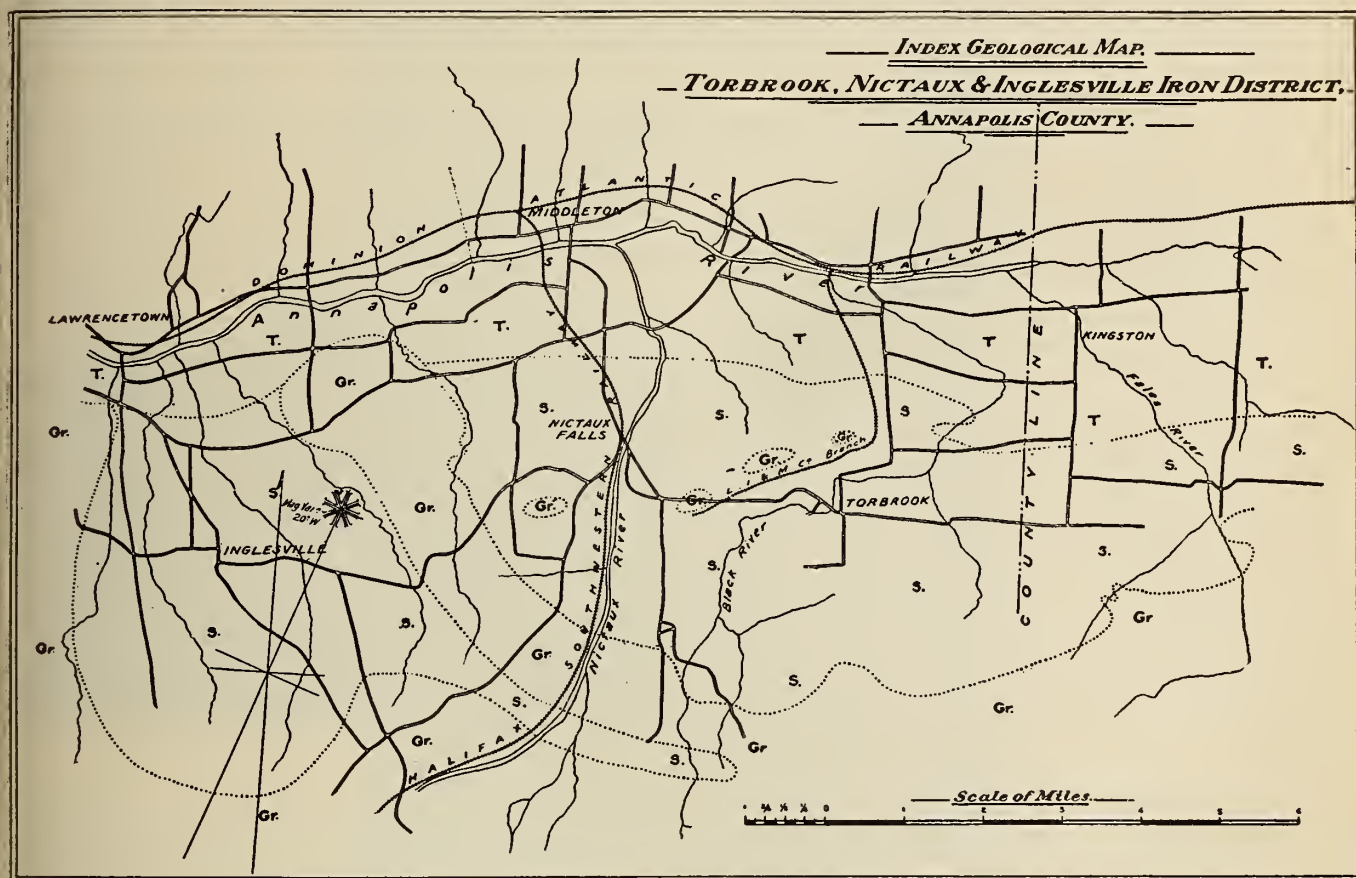


specified price but neglecting to bind the purchaser to buy within a specified time. The balance of the payment is to be made when the promoter closes his mining deal. Cases are not uncommon, if reports be true, in which the owners, after waiting a considerable time for the first bonders to put this deal through and make payment, have yielded to the persuasion of a newcomer, rebonding the property indefinitely and receiving another small advance payment therefor. Meanwhile, because of the wording of the option, the first bonders' legal hold on the property continues. Thus the difficulty of a final purchaser, ignorant it may be of the earlier history of the case, is very great in securing a clear title. The involved condition may easily discourage an investor and result in a failure to buy.

Unfortunately, it is much to the interest of any promoter to get an option upon mining properties that

ment will locate areas upon application. For any number of these areas licenses to search may be taken out at the Mines Office. For all purposes of license and lease, every area is composed of five unit rights, each containing one square mile, and the applicant receives one, two, three, four or five rights to search, according to his application. Should he apply for but one right, and no one is before him, he is given a first right; should he apply for two, they are first and second rights, and so on through the five. Should he not apply for all the possible rights, anyone else is at liberty to make application for and to receive any or all of the remainder.

**Conversion to leases.**—On or before the expiration of eighteen months the licensee must exchange the license of his first or otherwise earliest right for a lease of one square mile.



shall omit any time limit. The only gain which the owner would seem to derive from such a bargain is the opportunity to secure a second small initial payment, should a new adventurer arise. But this gain would appear to be slight, contrasted with the probable failure to consummate any final sale to which the dishonest practice described above leads.

#### Leasing From the Crown.

As the information contained in this report is in part for those outside the Province of Nova Scotia, the following general description is given of the procedure in acquiring rights to iron ore reserved to the Crown.

**Licenses to Search.**—The mining districts are divided into areas of five square miles each, in shape 2.50 by 2.00 miles. In a new district the Mines Depart-

This, if he is exercising a first right, he may choose from any part of the area, but its length must not be more than two and one-half times its breadth. This exchange he must continue to make at intervals of eighteen months or less, until all his rights are exhausted. If he does not possess all five rights, the rights of any later applicant are convertible in due course of time and in order, after his own have been exhausted, until in all five rights have been converted into leases. This would take seven and one-half years. Whenever a first right is converted into a lease, but four are left, and what was a second right becomes a first right. This change of numbers recurs at each conversion.

**Lapsing of licenses.**—There is one method that may be employed, if one does not desire the expense of a



lease at the time and is not working the property. Upon the expiration of the eighteen months the first right, if unconverted, lapses; the second becomes the first, and so on, leaving the fifth right vacant. The applicant may immediately, at 10 a.m. of the day following that in which the first right lapsed at close of business, make application for the vacant fifth right. But as some claim jumper—of whom there are not a few—may apply simultaneously, or a moment ahead, the proceeding is a dangerous one.

**Costs and tenure.**—The cost of a right to search is \$30, or \$150 for the whole area. This is a single charge, and the privileges which it confers last throughout the whole seven and one-half years without additional expense chargeable to the licensees themselves. The leases cost \$50 per square mile for the first year, and \$30 per square mile per year thereafter. The lease runs for twenty years, subject to three renewals, so that an operator may control iron lands from the Crown consecutively for eighty years. The fees for leases may be paid yearly, or for the whole twenty years in advance.

(To be continued.)

### GOLD MINING IN NEWFOUNDLAND.

Although little or no effort has been made to mine the auriferous deposits of Newfoundland, the reports of the geological surveys and of various private prospectors bear out the statement that gold is to be found in various parts of the island in quantities that will repay development of these areas. Assays of the ores of the baser metals, as copper and iron, have very frequently shown the presence of the precious metal and, in the case of the Tilt Cove Copper Co., for instance, appreciable quantities are often extracted from the products of some of the Newfoundland Mines. It is remarkable too, that the quantity extracted from the ore mined in the locality cited does not show any very great annual variation. In 1896 it was worth upwards of \$62,000 and in 1897 the value was the same. In 1898 the figures given were \$58,000. Gold to the value of \$25,000 has been extracted from the Tilt Cove ore during the last five years. The total value of gold mined in the island in any one year has never exceeded \$150,000.

One promising auriferous area has been discovered at a place called Sops Arm, situated in White Bay. This has been thoroughly explored by the government geologist and with encouraging results. The most pronounced auriferous rocks belonged to the Silurian series, although the gold was not confined to these. The quartz veins were numerous, generally running in the strike of the slates and seemingly conforming with them in the dip. One shaft sunk passed through several veins and one belt was found to consist of mixed quartz and slate over thirty feet in thickness. This latter was found to contain gold in quantities ranging from a mere trace up to several ounces to the ton. The district contains all the conditions characteristic of auriferous regions. The quartz veins have an aspect that suggests the presence of the precious metal. In colour they are a dull white, are not vitreous, and contain considerable intermixture of calc and brown spar, so that they are comparatively soft and easily crushed. The gold is frequently seen in the quartz entirely independent of other metals, but it is also found in association with zinc and galena. The geologist reports that the gold is

for the most part not visible, but that some rich specimens were seen in small nuggets, and that strings of the precious metal arranged along weathered edges of the quartz were quite perceptible. Several washings were made in his presence from quartz in which gold was not previously discernible even when the lens was used. Yet nearly all these washings exhibited signs or colours of gold and some were quite rich. One in particular, made from about three ounces of crushed vein rock, yielded an average of about ten ounces to the ton. Other washings made from material taken from a shaft and a distance of about thirty feet below the surface panned out about fifteen ounces to the ton. Desultory prospecting at another place, Cinq Cerf, showed the presence of gold in quantities ranging from a mere trace to a value of \$6 or \$7 per ton. Not very alluring certainly at first sight, but it must be remembered that these results were obtained from mere scrapings of the surface and that no systematic or extensive



STAMP MILL AT MING'S BIGHT, NEWFOUNDLAND.

prospecting of this area has been done. The property has really not been given an adequate test.

At Rose Blanche on the south seaboard of the Island is an auriferous area that the Director of the Newfoundland Geological Survey regards as of some importance. He states that the gold is there distributed rather sparsely through quartz leads, but is of the opinion that if mining methods similar to those of Canadian companies were employed, it could be extracted in paying quantities.

The only locality where gold mining in Newfoundland has been attempted on any considerable scale is at Mings Bight in the northern part of the island near the entrance to White Bay. Here an outfit consisting of a ten-stamp mill and a Wilfrey concentrator has been placed on the ground and an attempt has been made to discover just what the area is worth as far as gold production is concerned. The deposit is of the bedded type and is composed of magnetite slate, quartz, and pyrite. It dips north at an angle of about 60 degrees. The auriferous lode has been traced for



fully a mile through the company's property, which is known as Goldenville, and has a width of from 5 to 13 feet. A trial shaft was first sunk 50 feet on the eastern extremity of the deposit, then a working shaft was sunk at a point half a mile further west, and continued down to a depth of 100 feet. When this shaft had attained a depth of 17 feet a shipment of about twenty tons of ore was made to the Brookfield mine, Nova Scotia, for the purpose of having a mill test. This, upon being treated by amalgamation and cyanide process, yielded 11 ounces of melted gold, valued at \$209.00, as per N. Y. Assay office certificate, which is equal to a recovery of \$9.08 per ton; in addition five tons of slimes carried a total value of \$55 which was

4. The total recovery equalled 11 oz., in melted gold at \$19 per ounce, or \$209. Value recovered per ton equalled \$9.08.

A value of \$46.20 per ton in gold was obtained as a result of a test made on concentrates, the total cost of the treatment being \$2.40 per ton.

This result was considered so satisfactory that the shaft was continued and at a point 80 feet below the surface, levels were driven east and west along the lode, in the former case for a distance of 80 feet and in the latter 51 feet. The ore taken from the shaft was continually sampled, the samples being sent on to New York. A result of some thirty assays shows an average of \$12.44 per ton, a fairly good showing.



AGALMATOLITE—PSEUDO-TALC—NEWFOUNDLAND.

See issue of September 1st, page 525.

not saved. The detailed result of this test was as follows:

1. By amalgamation, bullion recovered, 8 oz., 4 dwts. (retorted gold).

2. Treatment of tailings by cyanide process: Assay value of sands, \$3.20 per ton; slimes, \$11 per ton. The value of tailings sampled at end of plates, \$4.95 in gold and 21c in silver, a total of \$5.16.

3. Cyanide test: Number of tons treated, 217.85; average value, \$4.43; recovered in bullion, 3 oz. 9 dwts; time of treatment, 54 hours; consumption of cyanide, 3 lbs. per ton; percentage of recovery, 82.

#### FILTERING GOLD SLIME.

The following method of filtering gold slime is given by Mr. E. Jansen, metallurgist to the Oroya Black Range Gold Mining Company:—"In small cyanide plants where a clean-up press is not provided, the filtering and washing of the gold slime after acid treatment of zinc is generally found to be a slow and tedious process, but the following arrangement can be very cheaply installed. It will save much time in the clean-up, and is, in fact, with small plants, a good substitute for a filter-press. The whole operation of washing and filtering can be done in the acid tub, and consists simply of applying the principle of vacuum filtration to the



clean-up. The appliances necessary are a filter-frame, a vacuum chamber and a vacuum pump. The frame is constructed of 3-4-inch piping, screwed together in the form of a square, with a T-piece let into one of the sides, to which pipe and hose can be fitted; the sides of the pipes toward the centre have 1-4-inch holes drilled every six inches. A filter cloth to fit the frame is made of two pieces of good canvas or cotton duck, between which are two layers of coarsely-woven cocoanut matting. The four layers are all held together by a few rows of stitching, about 3 inches apart. The cocoanut mat layers are made so as to fit easily inside the frames, the duck being left large enough so that the top and bottom layers can overlap the frame on opposite sides and can be well sewn together all round. This then forms an efficient cell for filtering solution. The frame is made of such size as to fit the bottom of the acid tub, with about 2 inches clearance all round. The vacuum chamber can be conveniently made from a sulphuric-drum, fitted with pipe connections.

After the acid treatment is finished, the tub is filled with water, and the contents well stirred, then after the precipitate has settled, the clear solution is decanted off. The remaining gold sludge is well stirred and the frame is put into the tub, and the cock to the vacuum chamber and pump are opened. The frame should lie horizontally on the bottom of the tub and remain there until all the liquid is drawn off; it can then be lifted from the bottom and placed upright against the side of the tub while sufficient water is run in for washing. The slime adhering to the frame is scraped off, and, together with the rest of the slime in the bottom of the tub, is thoroughly stirred up with the water. The frame is again laid horizontally on the bottom of the tub and the vacuum cocks are opened as before. One washing in most cases will be ample, but can easily be repeated if insufficient. After the liquid is all drawn off, the vacuum is maintained for a time so as to air-dry the slime as much as possible. The slime is then collected from the frame and from the bottom of the tub; with careful scraping very little need be left on either. What is left can, however, be collected by washing and sponging the tub and frame with about half a bucketful of water. The washings can then either be filtered through a small calico filter, or use may be made of the filter frame by laying it down flat and, with the vacuum on, slowly pouring the washings upon one side of it; when dry the slime is carefully scraped off. If the filtering is slow with only one frame, there is no reason why two or more should not be used."

### NEWFOUNDLAND PETROLEUM AREAS.

For a number of years it has been known that the formation of the west coast of Newfoundland—proschists at the base of the Silurian series—is oil bearing, and the desultory prospecting that has been done has proven that petroleum areas of considerable extent do exist there. Operations were carried on for several years at a place known as Port au Port on this coast and with satisfactory results. Three or four wells were drilled and at least three of them struck oil at from 136 to 684. The shallow well is said to have produced ten barrels a day for a month. The color of the oil is dark amber, the gravity 33 deg. Baume, and it possessed good lubricating qualities. Financial difficulties are supposed to have interfered with the increased and continued development of the area.

The Parsons Pond area, situated a little farther north along the same coast, is even more promising. The best of judgment does not seem to have always been displayed in the method of exploring the area, but in spite of this good results have been obtained. All the wells first sunk showed oil in greater or less quantity, one of them yielding 18 barrels of oil after about an hour's pumping. In 1901 the developing company put down a well to a depth of 2160 feet and struck oil in large quantity, the quality being superior. The oil apparently came from a lower set of petroliferous strata than any that had been previously bored. It burned freely even in its crude state and did not generate any explosive gas. By this year the company had sunk five wells, and while the quantity yielded was not very great, not one of them was dry. A new well sunk the following year to a depth of over 1,200 feet also struck good oil in considerable quantity. Attempts made to torpedo these wells failed, yet the season after the attempt was made on the deepest well, it was found to contain 900 barrels of oil.

During the season of 1904 several new wells were sunk in this area. One, partly drilled the year previous, was sunk to a depth of 2,050 feet, oil being struck at 1,470 and 1,750 feet. The well yielded an average of two barrels per day. A two months' test of this and three of the other wells resulted in an average daily yield of six barrels. Two wells were next sunk on the north side of the pond (lake). One was drilled upwards of 1,400 feet but gave a very poor yield of oil. The other, however, was the most productive of the lot, was pumped steadily for five months, yielding 4½ barrels daily. The oil from this well differed considerably from that obtained from any of the others. It was of great body and had a pale amber appearance. The superintendent reported that it was exceptionally rich in the more valuable lubricating oils, giving excellent results when used on his engines. It also gave a rich yield of paraffin, waxes and other useful by-products. During the season of 1906 two deep wells were sunk, but operations were not carried on with any very great vigor and some of the old wells became "drowned out." The company has unfortunately been hampered by lack of capital, a difficulty that has caused the failure of attempts at developing many promising Newfoundland areas. There is every reason why this petroleum area should be carefully and systematically developed on a large scale. The desultory operations carried on there have proved the existence of oil in paying quantities, and, further, analyses of this have proven its value for many industrial purposes. Several hundred barrels of the oil was used at the gas works in St. John's to enrich the gas production, the experiment being attended with most satisfactory results.

### AMERICAN MINING CONGRESS—PROVISIONAL PROGRAMME.

A partial list of the speakers who will appear at the programme for the twelfth annual session of the American Mining Congress, at Goldfield, Nevada, September 27th to October 2nd, appears below. The Programme Committee has not yet completed its work and this list will be materially augmented before the final programme is published:—

1. "Purchasing Coal by the B. T. U. Method," by Samuel A. Taylor, E.M. and C.E., Pittsburgh, Pa.



2. "The Paralysis of Mining Districts," by E. B. Kirby, St. Louis, Mo.

3. "The Forest Reserves and Other Public Land Questions," by Senator Weldon B. Heyburn, of Idaho.

4. "The New Experimental Ore Dressing and Metallurgical Plant of the Colorado School of Mines," by Prof. F. W. Traphagen.

5. "Industrial Accidents and General Liability Laws," by David Ross, Springfield, Ill.

6. "Old Days on the Comstock," by William C. Ralston, San Francisco, Cal.

7. "State Inspection of Metal Mines," by Courtenay DeKalb, San Francisco, Cal.

8. "Some Defects in State Inspection of Mines," by Harry A. Lee, E.M., Salt Lake City, Utah.

9. "Zinc Mines in the Good Springs District," by Douglas White.

10. "Geology and Ore Deposits of the Round Mountain District," by J. P. Loftus.

11. "Some Grievances of Ore Producers Against the Smelting Combine," by James H. Fox, E.M., Seattle, Wash.

12. "The Geology of the Goldfield District," by Prof. Chas. J. Moore, Goldfield, Nevada.

13. "Some Arizona Suggestions in Mining Law Revision," by Fred. J. Elliott, Globe, Ariz.

14. "Protecting Mine Investors," by Floyd Davis, E.M., Ph.D., Denver, Col.

15. "The Florence Mine," by A. D. Parker, Vice-President C. & S. Railway, Denver, Col.

16. "The Bullfrog Mining District," by Clay Tallman, Rhyolite, Nevada.

17. "The Ely Mining District," by Hon. S. W. Belford, Ely, Nevada.

18. "The Application of Steel to Mining," by Prof. R. B. Woodworth, Pittsburgh, Pa.

19. "The Effect of Silver Values Upon American Trade with Silver-Standard Countries," by James A. Heckman, representing Merchants' and Manufacturers' Board of Trade of New York City.

20. "A Bureau of Mines," by D. W. Brunton, President American Institute of Mining Engineers, Denver, Col.

Silver Discussion.—Additional views upon the silver question will probably be offered by Sir Moreton Frewen, of London, England; James J. Hill, of St. Paul, Minn., and John Hays Hammond, of New York City. Officials of the Mexican and Canadian Governments are also expected to be present and take part in this discussion.

Other Discussions.—Special discussions will follow the committee reports upon the following questions:—"The Prevention of Mine Accidents," "A Tonnage Tax on Coal Output for Distribution Among the Victims of Mine Accidents," "The Standardization of Electrical Equipment in Mining Work," "Needed Changes in Alaskan Mining Laws," "The National Forest Service," "Vertical Side Line Law," "General Revision of Mining Laws."

Sessions will begin at 10 o'clock Monday morning, Sept. 27th, and adjournment will be on Saturday afternoon, Oct. 2nd. On Wednesday the sessions will be held in Tonopah, the citizens of that city providing a special train to convey the delegates from Goldfield early in the morning, returning in the evening.

## REPORT ON CHROMITE DEPOSITS.

The Mines Branch of the Department of Mines of Canada has just issued a "Report on the Chrome Iron Ore Deposits of the Eastern Townships," by Fritz Cirkel, M.E.

In the last few years, owing to the rapid development of the iron and steel industry in Canada, more than ordinary interest has been manifested by the mining and metallurgical public in respect to the Canadian deposits of raw materials and ores, which enter into the manufacture of iron and steel products. To meet the demand for information on these subjects, the Mines Branch has undertaken to issue a series of reports on the Canadian deposits of the substances which form the basis of the iron and steel industry. Several reports on iron ores and one on tungsten ores have already been issued and the present report is another of this series.

The scope of the "Report on the Chrome Iron Ore Deposits in the Eastern Townships of the Province of Quebec" is best judged by quoting the Table of Contents, which is as follows:

Introduction. Chapter I., Historical; Chapter II., The Chrome Iron Ore Deposits of Canada; Chapter III., Mining of Chrome Iron Ore; Chapter IV., Dressing for the Market; Chapter V., Market Prices, and Status of the Canadian Industry; Chapter VI., Chrome Iron Ore Mines; Prospects in Canada; Chapter VII., Chrome Iron Ores in Foreign Countries; Chapter VIII., Origin; Chapter IX., Composition of Chrome Iron Ores; Chapter X., Statistics and Chronology; Chapter XI., Determination of the Value of Chromium; Chapter XII., Uses of Chromium; Chapter XIII., Technology of Chromium and Its Compounds; Appendix II. Experiments with Chromite at McGill University; Bibliography."

The report is well illustrated by eleven plates in half tone, from photographs of mines, mills and machinery; and fifteen diagrams, maps and drawings, all illustrative of the chromite industry. The author of the report is Mr. Fritz Cirkel, mining engineer. This work was entrusted to Mr. Cirkel on account of his long connection, as consulting engineer, with the chromite and the asbestos industries; the deposits of these two substances in the Province of Quebec occur in the same region, and the origin of both is closely connected with the serpentine rocks of the Eastern Townships.

The topography of the report is good and the book will form a welcome addition to the library of the mining engineer, the metallurgist, and the capitalist interested in the iron and steel industry. Moreover, it may be pointed out that the chapters on the uses, the technology, the metallurgy of chromium, and those on the origin, the composition of chrome iron ores, as well as the bibliography, will be appreciated by all students and investigators on the subject of Chromium and Chromite.

The book is obtainable on application to Dr. Eugene Haanel, Director of Mines, Department of Mines of Canada, Ottawa.

## ELECTRIC SMELTING OF IRON ORES.

As a sequence to the reports on Electric Smelting of Iron Ores published in 1904, 1906 and 1907, the Mines Branch of the Department of Mines of Canada has just issued the results of "An investigation of an Electric Shaft Furnace" in operation at Domnarfvet, Sweden. The investigation was made by Dr. Eugene Haanel in



December, 1908, on the invitation of the inventors, and the results given represent the latest developments of the electric smelting of iron ores.

The report contains 38 pages and is divided into four parts: Part 1 deals with the Domnarfvet furnace, the trial runs witnessed by the writer of the report and the comparative costs of production of pig-iron by the furnace. The other three parts, which are more of the nature of appendices, describe: (1) a new electric furnace for the manufacture of steel, (2) the manufacture of electrodes, (3) methods of manufacturing wood-charcoal, this material being used to supply the carbon

which enters into the composition of pig iron manufactured by electric smelting.

Three full page plates, from photographs, and numerous drawings, illustrate clearly the descriptive matter of the book, which, taken in conjunction with the reports previously published by the Mines Branch on the subject of electric smelting, brings up to date the literature on the electro-metallurgy of iron.

The "Report on the Investigation of an Electric Shaft Furnace" at Domnarfvet, Sweden, may be obtained on application to Dr. Eugene Haanel, Director of Mines, Department of Mines of Canada, Ottawa.

## THE LA ROSE DUMP.

Written for the Canadian Mining Journal by H. P. Davis.

After careful sampling and mill tests it was estimated on May 1st, 1909, that the various dumps at the La Rose mine, of the La Rose Consolidated Mining Company, contained 44,340 tons of concentrating ore assaying from 15 to 40 ozs. in silver to the ton and averaging 28.16 oz. to the ton, a total of 1,248,820 ozs.

Since that date the mine has produced approximately 10,000 tons of discard from the picking tables,

of \$562,850.00; deducting from this amount 12 per cent. for marketing charges will leave \$495,000.

A contract has been entered into between the La Rose Consolidated Mining Company, Ltd., and the Northern Customs Concentrators, Ltd., for the concentration of the dumps of the La Rose mine. This contract is on the basis of a certain fixed price per ton plus a percentage of the net smelter returns.



THE LA ROSE DUMP.

which averages about 15 ozs. to the ton, or a total of 150,000 ozs.

It is conservative to estimate that in these dumps to-day there are 55,000 tons of milling rock containing 1,400,000 ozs. of silver. Figuring on the basis of 85 per cent. extraction, this would yield 1,190,000 ozs. of silver of a gross value, at the present market price,

The cost of concentrating the 55,000 tons of mill rock, above referred to, and of loading the same on cars will be approximately \$186,000, leaving a net return to the La Rose Company of \$309,000. In addition to the 55,000 tons included in the estimate, there are about 10,000 tons in the main dump of "uncertain value," and as a portion of the old dump, which has



not been tested owing to the fact that it is covered up, will yield considerably higher percentage of silver than the estimated figures given above, it is safe to estimate a net return of not less than \$325,000 from the concentration of the mill rock in the dumps of the La Rose mine.

The La Rose mine is producing from its ore-sorting tables each day:—

|                                          |            |
|------------------------------------------|------------|
| 10 tons of 100 ozs. screenings . . . . . | 1,000 ozs. |
| 5 tons of 40 ozs. screenings . . . . .   | 200 ozs.   |
| 100 tons of 15 ozs. discards . . . . .   | 1,500 ozs. |
| 115 tons                                 | 2,700 ozs. |

The screenings have hitherto been shipped to the Denver Colorado smelter at the United States Smelting and Refining Company.

In concentrating ore averaging as high as 100 ozs. a recovery of 90 per cent. can be made. If this ore were handled by a local concentrator the daily production of screenings and discards from the ore-sorting table would yield a profit of approximately \$600 per day from the La Rose mine alone.

The Princess, University and Lawson are each producing milling ore in steadily increasing quantities. The Lawson mine will be productive of this class of material owing to the fact that, in addition to the strong and well-defined leads of high-grade ore, there are, on this property, a number of offshoots and small veins parallel to the main leads and the country rock between these offshoots and parallel leads and the main veins will make profitable concentrating ore.

Measurements taken across vein No. 11 at one point show 12 inches of bonanza ore, 5 feet of rock, 3 inches of ore, 5 feet of rock, 3 inches of ore, 2½ feet of rock and 2½ inches of ore, making a total of 20½ inches of high-grade ore in a zone of mineralization 9 feet in width.

### TUNGSTEN ORES IN CANADA.

A report on the Tungsten Ores of Canada, by Prof. T. L. Walker, of Toronto University, has just been issued by the Mines Branch of the Department of Mines of Canada at Ottawa. The report covers 56 pages and includes 15 illustrations.

Amongst the rare metals which have recently become of commercial value, tungsten is an important example. One of its most recent applications is as a filament in incandescent lamps, in which it gives a much more brilliant light with greater efficiency than carbon. Its most important use, however, is in the manufacture of tungsten steel, to which it imparts great elasticity and tensile strength. The metal has, therefore, become particularly valuable to the manufacturers of special steels. The known occurrences of tungsten ores throughout the world are comparatively few, which fact lends additional interest to some discoveries of scheelite (an ore of tungsten) which have been made within the past year or two in Nova Scotia. These, together with other occurrences of tungsten ores in Canada, have been made the subject of the present report, which is designed to present to those interested all the available information on these ores.

The several occurrences of tungsten ore in Canada are described in detail, and a general statement is given on the geological occurrences of the ores, chemical tests,

concentration, the uses of the metal, producing mines in other countries, statistics of the world's production, etc., while a very useful bibliography of the literature on Canadian and United States occurrences is added.

### CANADIAN PATENTS.

Below will be found a list of patents issued by the Canadian Patent Office on July 27, relating to mining and metallurgy, and furnished by Fetherstonhaugh &



OIL DERRICK AT PARSON'S POND, NEWFOUNDLAND.  
See page 558.

Co., 5 Elgin Street, Ottawa, Canada. Russel S. Smart, resident:—

119547. W. Scrimgeour, Norfolk, Va., furnaces and forges, Mires Fuel Oil Equipment Co.

119576. E. A. Custer, Philadelphia, Pa., modes of casting metal structures in permanent molds having permanent cores.

119590. R. Gartenmeister, Elberfeld, Prussia, Germany, processes for making readily inflammable phosphorous compounds or kindling and priming compositions, and compositions resulting therefrom.



119592. L. F. Gilman, Spokane, Wash., coffer dams for placer mining and pier building.

119606. W. Pfanhauser, Leipzig, Saxony, Germany, processes for the manufacture of ductile electrolyte iron.

119622. A. G. Betts, Troy, N.Y., processes of treating nickel ores.

119623. R. Huber, New York City, apparatus for desulphurizing ores.

119624. U. S. James, Newark, N.J., ore concentrators.

119644. G. V. Barton, Liverpool, Eng., salts or oxides of lead.

119656. L. Horst, Altona, Germany, carbonic acid motors.

119700. F. Concord, Swissvale, Pa., systems of distribution for mercury-vapor rectifiers, Canadian Westinghouse Co., Ltd.

119692. W. H. Yost, Montreal, Que., means for piling coal and the like, W. H. Yost, O. W. Meissner.

### EXCHANGES.

**The Mining Journal—75th Anniversary Number, August, 1909.**—The 75th Anniversary Number of our London contemporary is a formidable affair of more than 100 large pages of reading matter. Beginning with a sketch of its own history, it presents to the reader a large variety of articles, taking up progress in mining, ore-dressing and metallurgy.

On page 5 appears a reproduction of a page from The Mining Journal and Commercial Gazette, August 29, 1835, which is of unique historical interest. Despite the stilted phraseology, the editorial, 75 years old, displays commercial acumen and a laudable appreciation of the functions of mining.

We regret that the only article on Canadian mining is, to all intents and purposes, a prospectus of the Amalgamated Asbestos Corporation, Ltd. Thus the Mining Journal has fallen into one of the traps that are set for the unwary righteous everywhere. Of course, it has done so innocently.

Taken as a whole, our revered contemporary's anniversary number is decidedly worth while. It gives evidence of abundant vitality and enterprise.

**Mining and Scientific Press, Sept. 4, 1909.**—"Taxing Unoperated Land" is the caption of a leading editorial in this issue. The assessor of Huerfano County, Colorado, is to be removed from office because he assessed as grazing land the areas controlled by coal companies outside of the portions actually involved in mining operations. "If this step is taken," says the Press, "because of illicit transactions between the assessor and the coal companies, it is justified; otherwise it would seem to be drastic. The principle involved is not precisely that of taxing the unearned increment. No man can definitely affirm the amount of such unearned increment until a transfer of title occurs. Thus is seen the virtue of the laws prevailing in certain countries whereby real estate is not taxed directly, but an amount, usually five per cent. of the purchase price, is taken when the property changes hands. . . . Taxation is essentially a contribution out of earnings. Incidentally it seems as a deterrent to the locking up of

resources; but manifestly the simultaneous utilization of the great reserves of mineral deposits is impossible. These are held in trust for future generations. The ascertainment of their extent and richness, and their control by effective working organizations, is a distinct contribution to the welfare of the future."

### DEATH OF MR. C. G. WARNFORD-LOCK, M.I.M.M., F.G.S.

Charles George Warnford-Lock was the son of a mining engineer, and was born in Hampshire on September 9th, 1853.

He was educated at Cranleigh, and his first professional engagement was in the sulphur mines of Iceland. He was afterwards engaged in alluvial mining in Hungary, and later on held responsible positions as mine manager in the Black Hills of South Dakota and in New South Wales. It was in the latter country, in 1896, that he took charge of the Wentworth Gold Fields Proprietary Company's mines. While he was controlling affairs there a prolonged strike took place, and it was owing to his energy and determination that he was able to run the mines during the period of disturbance, and bring the strike to a satisfactory issue. Mr. Warnford-Lock also managed mines for the Bulawayo Exploration Company at Gwelo, Rhodesia; and for the Raud Gold Mining Syndicate in the Malay Peninsula. For some time he resided in Sydney, where he practised as a consulting mining engineer.

He was the author of several well-known works on mining and cognate subjects, of which the chief are: "Practical Gold Mining" (1889); "Mining and Ore Dressing Machinery" (1890); "Economic Mining" (1895); "Principles and Practice of Gold Milling" (1901), and "The Miner's Pocket Book," which ran into five editions, the last being published in 1907. In that year he also brought out his last work, "Mining in Malaya for Gold and Tin," the second edition of which has already been issued.

Mr. Warnford-Lock was one of the original members of the Institution of Mining and Metallurgy, and served on its council and on its various committees. He moreover contributed several papers on mining and metallurgical subjects to the transactions of the Institution, and always maintained a keen interest in its affairs and well-being.

He returned to Malaya in 1908, where he was engaged in inspecting and reporting on properties for various mining companies. An attack of ptomain poisoning in the autumn of last year seriously impaired his constitution, and he was compelled to take voyages to China and Ceylon to recuperate his health. These were unfortunately unavailing, for after eight weeks' severe illness he died at Bandarawella, Ceylon, on July 30th last.



# **FLOW SHEET OF THE GOLDFIELD CONSOLIDATED MINES COMPANY.**

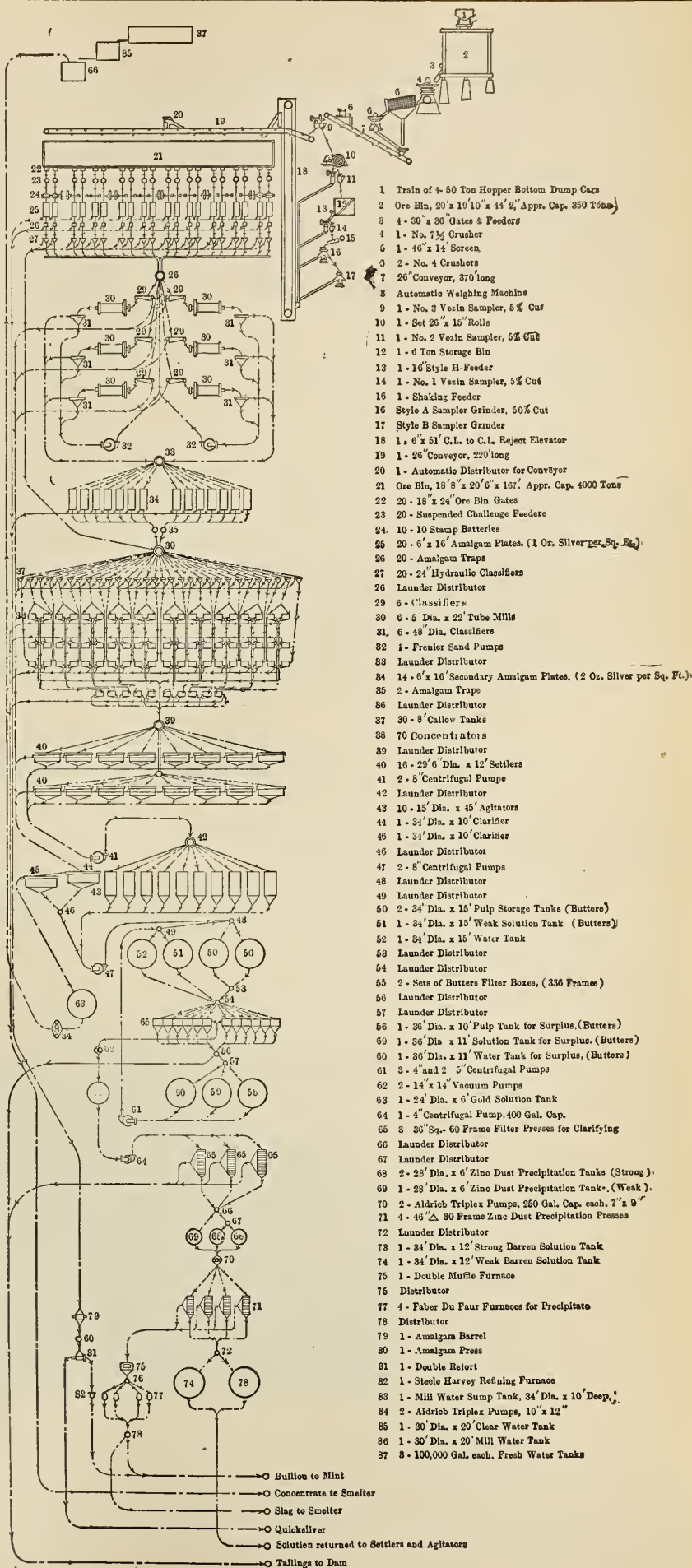
The Goldfield Consolidated Mines Company's 600-ton mill at Goldfield, Nevada, was designed and erected to remedy an intolerable condition. Before its erection, ore had to be shipped to outside points, and no ore running less than \$50 per ton could stand the charges imposed. The new mill starting upon \$50 ore, will soon treat \$30 ore. Ultimately the grade of the ore will be reduced to between \$10 and \$15. When this point is reached, practically everything between walls in the company's mines will be broken down and sent to the mill.

The mill site lies on the west slope of the foothills at the base of Columbia Mountain, near the Sandstorm claims, which were the first claims staked in the Goldfield camp. The company's mines are about a mile and a half southeast of the mill. Manager J. H. MacKenzie and his staff designed the mill; Francis L. Bosqui, metallurgical engineer for the company, was responsible for the cyanide end, and Grant B. Shipley, engineer of Allis-Chalmers Company, which furnished the machinery, designed the mechanical details of the entire plant.

The main building, built on a side hill, is of the usual terraced construction, and has four departments, all in one structure. The batteries occupy a section 50 ft. 6 in. wide by 210 ft. long; the tube mills a section 62 ft. wide by 210 ft. long; the concentrator section is 60 ft. wide by 266 ft. long; and the cyanide department is 222 ft. 6 in. wide by 294 ft. long. The difference in elevation between the first wall and the last wall is 132 ft. 1 in. Below this last level is sufficient fall to carry the tailings to the tailings dam in the desert below.

The mill building is entirely of steel construction, furnished and erected by the American Bridge Company of New York. There is between 500 and 600 tons of structural steel in the building exclusive of roofing and siding, which is of asbestos-protected corrugated metal.

It is impossible here to give further details concerning the construction of this phenomenal mill. The flow-sheet diagram that appears herewith shows fully the units that go to make up the equipment of this phenomenal plant, which is a monument to the engineering skill of its designers and to the efficiency of the manufacturers who supplied and installed the machinery.



### PERSONAL AND GENERAL.

Mr. Frederic Keffer has recently examined several Kamloops mining properties.

Mr. H. P. Davis, of Cobalt, has been ill in Toronto for some days. He is now on the road to recovery.

Mr. O. N. Scott has returned to Toronto after an extended visit to Cobalt and Gowganda, during which he conducted several examinations of mining properties.

Dr. W. G. Miller, Mr. J. B. Tyrrell, and Mr. Cyril Knight accompanied the visiting members of the British Association for the Advancement of Science to Winnipeg.

Mr. S. N. Graham, who for the last five years has been engaged in mining in Mexico, is at present in Kingston, Ont. Mr. Graham is a graduate of the Kingston School of Mining in both civil and mining engineering.

Mr. A. B. W. Hodges, general manager of the Granby Consolidated Mining and Smelting Company, sailed on August 26th from Vancouver for the Queen Charlotte Islands. Mr. Hodges is to inspect mining properties near Jedway, Lockport and Tasso Harbour.

Mr. R. J. McConnell, of the Geological Survey of Canada, has completed his work on Texada Island and is engaged in making an examination of the mining district in the Queen Charlotte Islands. This is the

first time in many years that a Survey official has visited these islands.

Mr. Charles Graham, one of the underground managers for the Western Fuel Company at Nanaimo, has been appointed mine manager for the Vermillion Forks Mining and Development Company, Princeton, Similkamen. He is a brother of Mr. Thomas Graham, of Nanaimo, General Superintendent of the Western Fuel Company.

Mr. Ernest Levy, of London, has been appointed to the position of manager of the Le Roi No. 2 mine at Rossland, made vacant by the resignation of Mr. Paul S. Couldrey, who recently accepted a position with the British Columbia Copper Company as superintendent of the Mother Lode mine at Greenwood. Mr. Levy, who is familiar with the properties of which he will have charge, having on several occasions filled the office during Mr. Couldrey's absence, is expected to arrive in Rossland in a few days.

Prof. R. C. Allen was selected August 9th to succeed Mr. Lane, whose resignation we announced in the July number, as State Geologist of Michigan.

He has been Assistant Professor of Economic Geology at the University of Michigan the past year, was a favorite pupil of Prof. Leith at Madison, and under him has done work on the iron ranges both of Northern Michigan and of Canada.

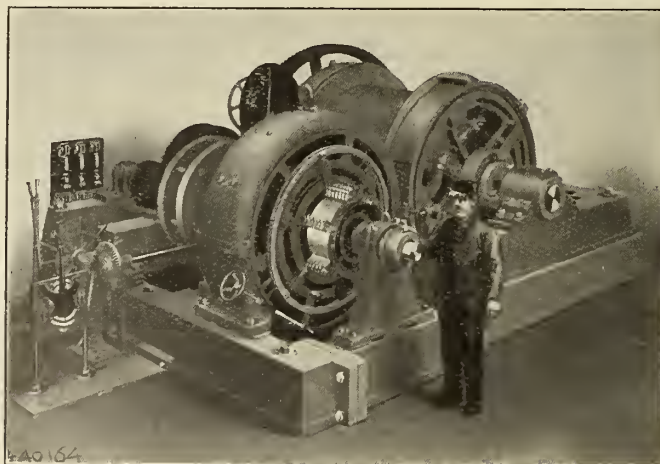
## INDUSTRIAL NOTES.

### LARGE ELECTRIC MINING HOIST WITH 500 H.P. Motor.

There was recently installed in the mine of the Washington Coal & Coke Company at Dawson, Pa., a large mine hoist with an electric motor which presents several features of considerable interest.

is reached near the top where the loaded cars are pulled in on a landing on a grade of about 6 per cent. and on a curve of 150 foot radius. The empty cars will be allowed to drift down the slope by gravity, controlled by a brake on the hoist drum.

The hoisting drum is six feet in diameter and five feet wide between flanges. It is fitted with a hand



The hoist is used to haul thirty-five mine cars, averaging 3,800 pounds each when loaded, up a maximum grade of 8 1-2 per cent., 8,000 feet long at a speed of 600 feet per minute. The loaded cars start at the bottom of the slope on a 4 per cent grade, which gradually increases until the maximum grade of 8 1-2 per cent.

brake on one end, and a hand operated friction clutch on the other end. The drum is of very heavy steel construction, with a 12-inch shaft. All the gears on the machine are cast steel with machine cut teeth, the main spur gear being 10-inch face and the motor gears 13-inch face.



The frame is made in sections for convenience in installing in the mine. The drum and large gears and the friction clutch parts are also made in two pieces for the same purpose.

The hoist is driven through a flexible coupling by a 500 H.P. direct current non-reversing compound-wound Westinghouse motor. It is controlled by a standard semi-automatic Westinghouse magnetically-controlled unit switch controller. These switches are operated from the controller shown in the illustration, the controller carrying only small currents, while the main motor current is handled by the magnetically operated switches, thus doing away with the difficulties from arching.

This controller has an accelerating relay which prevents the starting switches from closing too rapidly and thereby prevents too large starting currents. Thus the second switch cannot close until the current allowed to flow by the closing of the circuit has fallen to a predetermined value. As soon as this value is reached the second switch closes thereby short-circuiting a resistance section and the current rises, but the third switch cannot close until the current has again fallen to the predetermined value. This not only prevents injury to the motor from careless handling during acceleration, but also insures the most rapid starting possible.

The controller also has a safety relay which opens the resistance switches in cases of excessive overload, and thereby protects the motor while running. If this relay operates while the motor is running, the motor

does not stop but is automatically brought up to its full speed again. This is a particularly valuable feature in an installation of this kind where the cars may strike some obstruction, as it affords perfect protection to the apparatus.

When it is remembered that this hoist is installed some 800 feet below the surface of the ground, the advantages of the electric transmission of power are evident. In no other way could this large amount of power be transmitted as economically, or as easily.

The hoist was supplied by the Connellsville Manufacturing and Mine Supply Company.

### THE LONGWALL SYSTEM OF MINING.

In the case of the flat reefs in the Far Eastern Rand the longwall system of mining has been adopted, because it reduces mineral losses to a minimum and affords better facilities for the application of mechanical power through permitting a continuous working face, extending over many hundreds of feet in length and to allowing the level to be driven 500 feet apart. This will simplify the working. This class of mining is much more prevalent in the coal mines of the Continent than in this country in consequence of the flatness of the seams. The driving of levels so far apart is a great saving, as in steep angles of dip the levels are made 100 feet instead of 500 feet apart.

## CORRESPONDENCE.

To the Editor of The Canadian Mining Journal,

Sir,—I have read with much interest Dr. Ledoux's article on "The Sampling of Cobalt Ores," which appeared in your issue of July 1st and on which you specially invite discussion.

The fact that Messrs. Ledoux & Co. consider that the errors of any system of mechanical sampling on rich Cobalt ores are of sufficient magnitude to warrant the laborious and costly hand sampling method now in use in their works, while mechanical sampling is employed on the same class of ores at Copper Cliff, Deloro and Denver, surely proves that discussion is likely to be both interesting and valuable.

The present practice of Messrs. Ledoux & Co. reduces the labour and cost of their former methods very considerably with, to my mind, no sacrifice in accuracy; for, though four samples, each reduced from the original, should theoretically agree with each other more closely in assay value than samples reduced from four quarters of a well mixed whole, the average value of the latter four samples should be at least as accurate as the average of the former. This principle, which is apparently admitted by Messrs. Ledoux & Co., since they have adopted it in their latest practice, is an important one.

Dr. Ledoux states that one of the two chief objections to automatic sampling devices is that they "do

not admit of taking more than one sample of the whole lot starting practically from the beginning each time."

Though this is true of the single samplers at present in general use, in mechanical sampling plants in most districts, double samplers, giving two separate samples of the whole, have for some time been in the market, and it would not be a difficult matter to make samplers, which would give three or four such samples if desired.

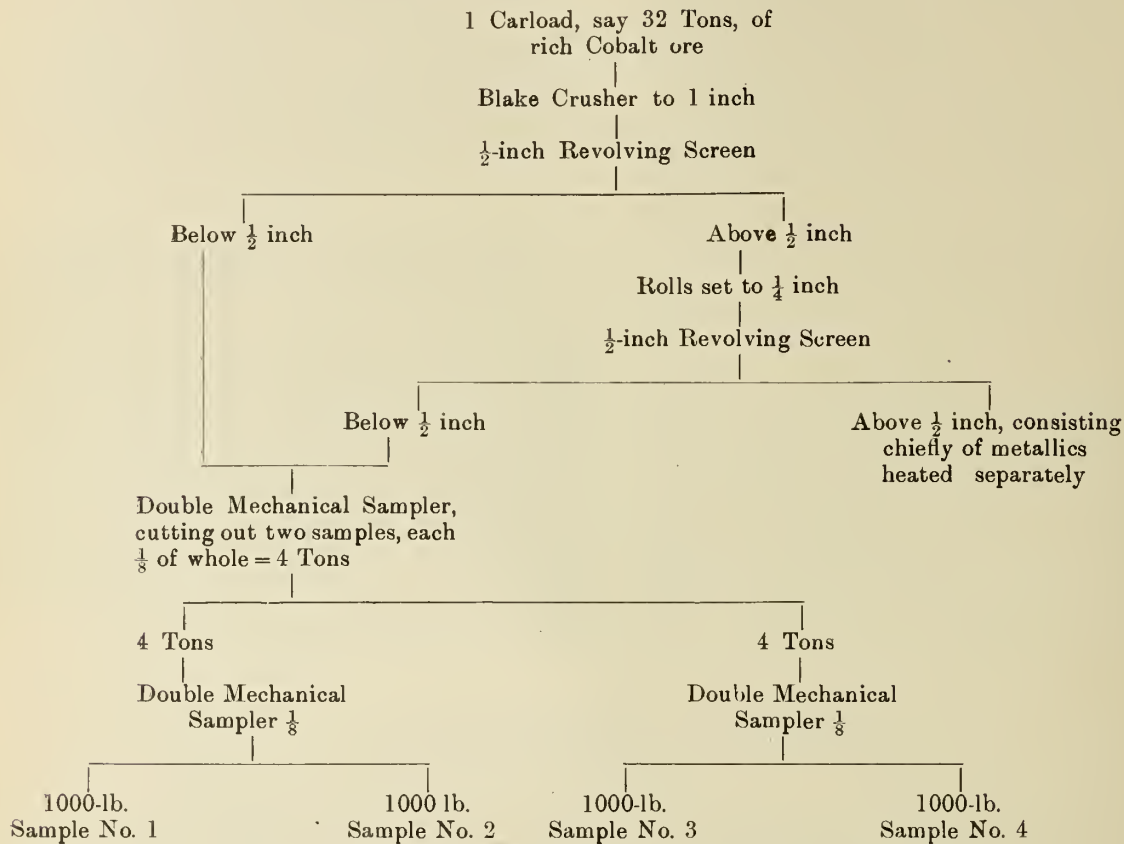
Now it is apparently admitted, according to Dr. Ledoux's article, since this is not one of the objections raised, that mechanical samplers can in one operation cut out as fair a sample, up to a certain point, as can be done by the successive coning and quartering by hand to the same fraction. A series of experiments to settle the proportion, which could thus be cut out as accurately as by hand on the same material would be worth making.

In the proposed sampling plant below I have assumed that one-eighth is a safe proportion to cut out in one stage.

In regard to the objection that there is a "possibility that in grinding in a ball mill or other similar device there may be a mechanical concentration in the mill"—this there undoubtedly is, with the result that the last ton or so is not only enriched but gets increasingly richer toward the end. There seems, however,

no reason to suppose that any greater error should be introduced in sampling this than in sampling the bulk of the ore, which runs through it under exactly the same conditions.

This possible error, however, could be eliminated by crushing by the same or similar means to those adopted by Messrs. Ledoux & Co. in hand sampling, in some such way as outlined below.



Continue as in latest method in use in Messrs. Ledoux & Co.'s works.

An economy in capital outlay could be effected, where speed in sampling was not important, by receiving the 4-ton samples in separate bins, from which they could each in turn be returned to the first sampler.

The above scheme of sampling could doubtless be

improved; but will serve to show the directions in which the laborious and costly hand sampling methods under discussion could, in my opinion, be reduced in cost and labour without sacrifice in accuracy.

D. B. Langford.

## SPECIAL CORRESPONDENCE

### NOVA SCOTIA.

The Dupes of the U. M. W. A. in Nova Scotia.—The true inwardness of the U. M. W. A. trouble in Nova Scotia has been overshadowed and befogged by a multitude of side issues, intelligible only to the initiated. With a few commendable exceptions, the newspapers have been unable to disassociate their political predilections from the real points at issue. The "Montreal Gazette" recently remarked: "Politics have entered into

the U. M. W. A. situation in a manner that no one outside of Nova Scotia can understand." It may be added there are people in Nova Scotia also who cannot sight the political bearings of the present trouble, for the ways of the politician are dark and tortuous, and do not invite the closest inspection. Be that as it may, there is one fact that emerges clearly and more clearly from the mists of misrepresentation, namely, that the miners of Nova Scotia who have listened to the leaders of the U. M. W.



of America have been wantonly, wickedly and most cruelly duped. The present condition of the followers of the U. M. W. is not without a certain irony, but of the grimmest, and not to be compared with what is to follow. The victims of the glaring lies, the naked and unashamed mendacity of the salaried American strike-breeders have this coming winter to face bitter adversity and penury, aggravated by the knowledge that the workers of this deception will not share in nor suffer from the certain harvest of their deceit, and by the further knowledge that their fellows who refused to listen to the orators of the piratical U. M. W. A. and persisted in remaining at work as advised by their Canadian officers, have been richly justified in their course.

There is one word only which is strictly applicable to the actions of the U. M. W. leaders in Nova Scotia. They have acted wantonly. Apart from the unbelievable mendacity of these men, which is their outstanding characteristic, their campaign has been conducted with such an utter lack of common-sense, with so palpable a disregard for the welfare of our industries and our Canadian institutions and for any ultimate success which the U. M. W. might conceivably hope to attain by the use of those methods which are approved by honesty and public opinion, that we are perforce driven to the conclusion that these men are actuated solely by a desire to do damage, to run amuck. Their methods are iconoclastic, but without consuming zeal to condone them. Wicked and wanton destruction has marked the doings of the U. M. W. A. in Nova Scotia this summer. The leaders claim falsely that they were invited to Nova Scotia. If we may be pardoned the use of a metaphor, these self-invited guests have committed arson upon the dwelling of their host, and will depart hurriedly, leaving behind a scarred and roofless ruin and a beggared household.

There is a distinct difference between the situation at Springhill and that at Glace Bay. Strikes at Springhill have become a habit, and it is more than probable the thinking portion of the Provincial Workmen's Association regard the defection of the turbulent lodges of Springhill with great complacency. It is quite understandable that affiliation with so rampantly militant a union as the United Mine Workers would appeal to the Springhill men, particularly as the principles of international socialism have permeated Springhill for many years. After President Lewis' interview with Mr. Cowans and his strictures on the poorly balanced distribution of the mine labour there, added to the report of the Conciliation Board, it might have been thought that the leaders of the U. M. W. A. would for the sake of their union funds have tried to restrain the Springhill men from once more indulging in their annual diversion of a strike. Instead of this, however, they prepared a schedule of wages so grotesque in its demands that to read it is to laugh, and the resolution to strike was carried in the usual wanton manner of the U. M. W. by show of hands, and not by secret ballot. The ballot was carefully avoided by the leaders, as they knew it would have resulted very differently from the light-hearted show of hands. The leaders of the U. M. W. A. were under no misapprehension as to what would take place if a strike were called. They knew that recognition of the U. M. W. A. and acceptance of its demands were impossible, and knowing this, not only did they call the strike, but they even refused to allow the pumpmen and enginemen to work. The mine is indefinitely closed, a portion of it permanently abandoned. Is it to be wondered at if people conclude that the U. M. W. A. have no constructive policy, but are bent upon mischief for mischief's sake. No other conclusion can be arrived at.

As we have explained in previous correspondence, the desire of the U. M. W. A. to obtain control of the miners of Eastern Canada was based upon the fact that our coalfields here are the only serious competitor the bituminous mines of the United

States have to fear, and it is a natural and not unstatesmanlike policy on the part of the U. M. W. A. to endeavor to dominate the miners of Eastern Canada, for reasons that it is unnecessary to detail, so obvious are they. Unfortunately this policy has become confused with the personal ambitions of President Tom Lewis, whose office is open for re-election in January next. President Lewis' opponents are strong, and his re-election will be vigorously opposed. The addition of a solid Nova Scotian vote in his favour would ensure Lewis' election. Under the rules of the U. M. W. A. every person in receipt of strike pay is de facto a member. Up to the time of the Nova Scotian strikes the members of the U. M. W. A. were few, and fewer still had paid their dues. The strikes were called to hold together the membership of the U. M. W. in Nova Scotia. Had they not been called, the agitation, not being grounded in any real complaint, but being purely an artificial unrest skilfully fomented by salaried strike-breeders, would have died a natural death this summer, and President Lewis would have lost his votes. For this same reason it may be anticipated that the U. M. W. A. will not call off the Nova Scotia strikes, but will continue to dangle before the eyes of their poor dupes the same old illusions as long as they will serve their purpose. It is further not to be anticipated that the U. M. W. will trouble much about their Nova Scotian victims after next January, for the reasons following: Mr. Lewis' opponents are not in sympathy with the predatory and extra-national policy pursued by the present leaders, and in case they oust Mr. Lewis, they will speedily put a stop to the idiotic waste of their union's funds in Nova Scotia. If Mr. Lewis, by the help of the Nova Scotia strikers, manages to gain re-election, his ambitions will be gratified, for then he will be assured of a certain life-sinecure in the gift of the U. S. Government. Therefore, no matter how President Lewis' election goes, the Nova Scotian members of the U. M. W. A. will assume the unenviable position of the "poor relation," and will still further realize their folly.

The case of Dominion No. 1 colliery of the Dominion Coal Company presents an epitome of the piratical and intrusive policy of this foreign union, and illustrates very well their propensity to "butt in." Throughout this strike "Dominion"—as it is usually termed—has maintained an output of from 200 to 300 tons greater than it produced during the corresponding months of last year, and the workmen of that colliery have worked as they never did before. But in order to prevent forcible interference with the workmen by the idle U. M. W. A. pickets from other collieries the company were obliged to fence and guard the mine as rigidly as any of the other collieries, although practically every man was wishful and determined to continue at work. Dominion is the home of the grand Secretary of the Provincial Workmen's Association, and a stronghold of the P. W. A. For once a prophet has been honored in his own country, and Mr. Moffatt can withstand with equanimity the abominable torrent of lies and invective that his enemies have poured upon his devoted head, when he considers how loyally the members of the P. W. A. stood by him and their contract in his own village. But we may ask, is it right, is there any justification or reason why a coterie of salaried and trained breeders of discord, preachers of sedition and lawlessness from an alien country should be allowed to harry and persecute a body of Canadian workmen whose only request is to be allowed to mind their own business and manage their own affairs, and to put Canadian corporations to great expense for police protection, which the constituted authority of this amazingly democratic country was unable to afford. Where is the consistency between the Alien Labour Act of Canada and the toleration of a state of affairs such as we have referred to? If ever the term "conspiracy in unlawful restraint of trade" were justified, surely it is as applied to the unrestrained insauity which the U. M. W. A. is committing in our very midst.

One of the most unfortunate effects that have been brought



about by the discontent-mougers sent here from the United States is the disturbance of the pleasant relations which have hitherto existed between the management of the Dominion Coal Company and its workmen. We have previously emphasized the fact that the present strike is the first in the history of this company, the only one in sixteen years. Will it be believed that a part of the campaign to which the U. M. W. A. has devoted very large attention has been the destruction of these amicable relations and the inculcation of a spirit of disbelief and distrust in the good faith of the management. Before the strike the leaders of the U. M. W. A. gave publicity to a report that the policy of the general manager was not endorsed by the higher officers of the company, and that the general manager was in disfavour. The president of the company gave most emphatic denial to this report. Thereupon it was reported that the Board of Directors would veto the policy of the management, and these lies were given to the dupes with portentous solemnity at every lodge meeting. Now the U. M. W. have tried a fresh tack. They are gravely stating that the failure of Springhill to make its shareholders rich is due to gross mismanagement by the present responsible officers. The general manager of the Dominion Coal Company is now considered by the U. M. W. A. leaders as "no longer fit for his job." Such a statement from such a source discovers a desire on the part of the U. M. W. gentlemen to get rid of an opponent who has driven them hard, and is, in fact, a reluctant compliment. These tactics, of course, merely raise a smile among those who are competent to judge, but they serve their purpose among those who meekly swallow any lie proffered in the name of the U. M. W. The magnitude of the falsehoods set on foot by these walking delegates is only equalled by the incredible gullibility of their dupes.

The "Montreal Gazette," in commenting on the situation, remarks: "If the strikers have any wise friends, they will advise them to return to work as rapidly as they can. The U. M. W. organization is a reed that the longer they lean on it the worse it will pierce their hands."

The wisdom of this remark is undoubted, but it will not be heeded, and that is the pity of it. To satisfy one man's ambition, and to aid the political advancement of a few others, there has been brought about—we speak advisedly—a state of affairs more disastrous than any previous labour crisis in Nova Scotia. The loss of millions of dollars, of trade, of work, of homes and savings, or confidence, of reputation, all these have seemingly been necessary to teach us that Canadians can manage their own affairs without the assistance of American usurpers, and that all our elaborate legislation to protect Canadian industries against American interference is useless. We are a nice, quiet, long-suffering people in this Dominion, and the United States labour agitator is fully aware of the fact.

### QUEBEC.

**Sherbrooke.**—There is a deposit of tripoli in Stanstead County, from which many boxes have been filled and sold, as it is an excellent polishing powder, but the extent of it has not been ascertained.

The management of the Compton Gold Dredging Co. has apparently dug up another excuse for delay. When individual interests and private stock deals are allowed to interfere with a promotion, before it has fairly got its feet on the ground, it is mighty apt to be a good candidate for the slow race.

The variety of Quebec minerals shown at the Fair is a surprise to nearly all, and strangers wonder that so little development has been done in this province.

But many a promising prospect never gets beyond the promotion stage. Stupid incompetency, and consequent misstatements and perversion of simple things to cover the same, are

as bad in results as criminality, and even verge thereon. Yet to kick a certain small animal is a poor remedy for bad odor. One can only avoid intimate association after seeing its stripes.

The New York "expert" recently at Moe's River, after his employer's expressing his desire to have him meet Mr. Hardman, on being apprised of that gentleman's expected arrival, took the first train for home and mother. There's a large sized colored gentleman in the aggregation of fibrous fuel, and only his head is out of sight.

The introduction of a foreign element, with capital, is desirable, but the same without even credit, and with the capital yet to be made, is as deadly as the sleeping sickness.

The New York people who had an option on J. McDonald's copper property in Weedon have allowed it to expire, although the result of work done was more than gratifying. It is rumored that the same thing has resulted on Geo. E. Smith's mine at Memphremagog, although a new and probably permanent main vein has been uncovered, and the property is looking better than ever.

The bum brokers, etc., who, posing as mining men, reach out from New York or Montreal, with one hand to get a grip on a property, and with the other for an "angel" to put up the funds, are doing serious injury to the mining interests of the townships. Failing to secure the "angel" they invariably give the property a black eye, rather than confess their inability to make good. Sometimes they get an option, which is allowed to expire, then they banter for better terms. But don't imagine you can spot them at sight, or by Bradstreets. Like other confidence men, they put up a great front, and, having no scruples, get your confidence by pleasant manner, much promising and wheedling, until they are in a position to bully. Then the mask is dropped, sometimes a little prematurely, perhaps. The only safeguard is to insist on a substantial cash payment down. If your people won't or can't make that, cut them out.

Some specimens of bituminous coal from Stanstead were shown at the mineral exhibit at the Fair, said to be from several narrow seams. Following the usual line, the owner will probably put the price of \$100,000 or more on that farm, until he finds it mostly bituminous shale.

John E. Hardman, S.B., M.E., and a party came to Sherbrooke, Tuesday, the 7th, to inspect some local properties.

### ONTARIO.

**Gowganda.**—The wagon road from Elk Lake to Gowganda has been cleared and graded for ten miles. The work is making good headway, and it is hoped that the whole road will be completed and ready for traffic before winter. Over one hundred men are working at present.

The road from Bisco to Gowganda is already cut, and most of it is already cleared of bush and stumps.

Now that the fly season is over and the camp has been able to get down to work in earnest, many new veins have been uncovered. A new vein carrying native silver was found on the Ryan, Gowganda, while trenching recently.

Active prospecting work is now being carried on at the Hedges claim, which adjoins the Boyd-Gordon.

The Reeves-Dobie property now have their machinery installed. On their north claim three new veins have been uncovered carrying good silver values.

The Bonsall mine near Miller Lake has stopped all underground work, and the mine has been completely closed down, except for some surface trenching. It is said that the shut-down was caused by the ore pinching out.

On the Boyd-Gordon their No. 8 vein has been cut in the south cross-cut at a depth of 80 feet. The vein averages from



four to six inches wide, and carries native silver and smaltite right across.

The Morgan mine has been sinking on the big niccolite vein. Silver has been struck in the shaft at a depth of 25 feet.

Several new smaltite veins have been discovered recently on the Mann property. A new vein has been uncovered north of the original discovery of a vein averaging two inches wide, which is heavily shot through with native silver.

On the Morrison claim near Miller Lake active prospecting work has been carried on for some time. Seven silver-bearing veins have been uncovered. The most recent is a six-inch vein assaying from four to five thousand ounces per ton. A company known as the Northern Mining Company has recently been incorporated to develop and mine the claim.

On the Millerett mine, in the Miller Lake district, formerly the Blackburn, two shafts have been sunk and considerable open cutting and tunnelling done. The main shaft, sunk beside the principal vein, is down a distance of 80 feet, and No. 2 shaft is down 50 feet. About 200 feet of drifting has been done from both shafts. On the main surface vein 100 feet of open cutting has been done, followed by a tunnel 120 feet long, which follows the vein into the hillside. The company has commenced stopping on this vein. The Millerett property consists of 40 acres, and 65 men are employed, a portion of whom are doing trenching and surface work.

At the Big Six mine, not far from the Millerett, two shafts have been sunk for 50 and 65 feet respectively, and some drifting has been done from both. The ore is all being left in the stopes, but a considerable amount has been blocked out. The property consists of 160 acres, and 25 men are employed. At present no surface work is being done.

**Port Arthur.**—The furnace of the Atikokan Iron Company is now producing No. 1 iron steadily. The output is about 100 tons per day, and will be gradually increased. The ore-roasters are working efficiently, reducing the sulphur contents of the ore from about 2 per cent. to a figure that presents no difficulty from a fluxing point of view. The roasted ore averages about 61 per cent. iron. The coke ovens are on 72-hour coke, 30 ovens producing all the fuel now necessary. Six and a half tons are charged per oven, where formerly only  $4\frac{1}{2}$  to 5 tons were charged. The yield is 4 tons of coke per oven. One Covington coke-drawing machine, operated by two men, draws the thirty ovens. The total number of men employed at the ovens is 8, viz: Foreman, operator and helper on Covington machine, 2 back-scrappers, 2 chargers, 1 labourer to plaster doors and water coke. The drawing is usually completed by 2 o'clock. The saving in time and labour under the present arrangement is considerably more than 100 per cent.

A "Brown" hoist, with bucket and magnet attachment, is another labour-saving addition to the plant. With the bucket attachment cars can be loaded with limestone or ore with a minimum loss of time. The magnet attachment is used to handle and load pig iron. It lifts 20 to 30 pigs at a time, and in loading a car makes two trips per minute.

A slag-granulator is also installed. The granulated slag makes excellent ballast, and is much in demand.

**Cobalt.**—The Silver Cliff mine is putting in a 30-stamp concentrator to handle the large quantity of low-grade ore which they have on the dumps and in the stopes. The contract for the machinery was given to the Traylor Engineering Co. They have also purchased an electrically driven hoist.

Every once in a while reports are heard of new strikes on the Beaver. These strikes are simply chutes in the same vein. This vein is irregular, and the values pinch in and out.

There is a good deal of activity at Cobalt Lake owing to the fact that development on the vein discovered some time ago has

shown that it increases in width and values. When first discovered it was about 3 inches wide but now there is about 6 inches of high-grade ore.

In the dump of the La Rose, which is being treated by the Northern Customs Concentrator on a royalty basis, it is estimated that there are about 45,000 tons of ore, with a gross value of about 1,250,000 ounces. The profit accruing to the La Rose will be about \$330,000.

The development on the latest find on the Lawson has shown that it is one of the richest so far discovered. It has been uncovered for a distance of over 175 feet, and in one spot there is about 14 inches of high grade ore, and the wall rock is also well mineralized. The shaft sunk on the Keewatin vein has also been productive of very good results. On the surface there was only about one inch of ore, but in the bottom of the shaft, which is now down about 45 feet, there is a 6-inch vein of smaltite, carrying good values in silver.

Until further action is taken with regard to the Provincial mine, this property will rent their air to the Waldman claim in the Gillies Limit, and the Goulds Consolidated on Cart Lake. The Waldman now have their pipe line in, and are operating one drill. The Gould Consolidated have also connected up, as the Nipissing need all their air for their own use. The Waldman has lately installed a small boiler and hoist, and the work of sinking the shaft will be carried on rapidly. So far the development on this property has not been productive of very encouraging results, as the vein which showed such high values on the surface has changed to calcite, with a small stringer of cobalt, which carries but little silver at the bottom of the shaft.

A discovery of importance was made a short time ago at the North Cobalt mine, which is in the same vicinity as the Green-Meehan, Red Rock, Black Mining Co. and others. The North Cobalt Mining Co. commenced work in 1907, and sank on a small vein of calcite carrying practically no values. The shaft was sunk for a depth of about 60 feet, but as the results obtained were not very encouraging, work was stopped and the property lay idle until the Jacobs Exploration Co. took over a working option and obtained control. Machinery was installed and the work was persistently carried on. When the shaft was down 182 feet a cross-cut at the 170-foot level was started, and when the working was in about 40 feet the new vein was encountered. At this point there is about 20 inches of calcite carrying considerable silver.

The most important find of the season outside of Cobalt was made a short time ago on the Morrison claim, a property in the Le Roy group to the south of Miller Lake. A good deal of surface trenching has been done on the property, and several very promising leads were discovered. The one that has caused the excitement is a 6-inch vein carrying about four thousand ounce ore. A company known as the Northern Mining Co. was recently formed to develop the property, and it is financed by Montreal and Ottawa men.

Three new veins, known as Nos. 128, 130 and 131, have been found on the surface at the Nipissing. The first has been uncovered for about 60 feet, and shows one to two inches of high-grade ore. The second, which was found only a short distance from No. 129, varies in width from 2 to 6 inches of high-grade ore. No. 131 was found in the same locality.

The diamond drill which has been working on the Alexandra property to the south of the Cobalt Central, shows that the Huronian slates underlie the diabase at a depth of about 250 feet. At the present time the shaft is down about 160 feet, and when this has been timbered and put in shape, sinking will be continued to the 250-foot level. The good results obtained in this formation by the Cobalt Central have decided the management of the Alexandra to continue their development work to a greater depth.



The large number of new companies that have been formed recently to exploit properties in this district is a forerunner of the boom which will come this fall. Altogether new companies with a capitalization aggregating about twenty millions have been formed. The one of most interest to this district and the outside public is the Hudson Bay Mines, Ltd., with a capitalization of \$3,500,000. This company will take over the Coleman Township properties of the Temiskaming & Hudson Bay Mining Co.

Another drilling contest, open only to local teams, will be held on Labour Day, Sept. 6th. It is understood that Page and Pickens, of Globe, Arizona, who won the \$1,000 prize in the competition held August 19th, will give an exhibition. The work done by these men was a revelation to the local teams, and it is expected that the contest on Labour Day will be much improved in consequence of this.

At a point about 300 feet north of the first strike on the Foster another important discovery has been made. The vein has been uncovered for some distance, and shows a width of about 6 inches of high-grade ore. Considering the conditions of the lease which the argentum Mines Co. has on this property, it is doubtful if the Foster stockholders will benefit very much.

The Silver Lake Mining Co. at Silver Lake has let a contract for 1,500 feet of diamond drilling. The machine has been shipped in through Elk Lake, and been installed. This is the first diamond drill to be used in this section of the camp, and the knowledge of the formation which will result will be of great benefit to the surrounding properties.

It is reported that in the near future the Crown Reserve will commence the construction of a concentrator. There is a large amount of ore on the dump and in the stopes, but the main reason is the result that has been obtained in the recent development in the Keewatin formation. At a depth of 170 feet the conglomerate gave place to Keewatin, and although there was no great change in the value of the ore, the veins were found to be much more split up, and as a consequence mining operations result in the production of a much larger amount of low-grade than formerly. The east and west winzes have been connected at the 200-foot level, and a raise has been started to connect with the main shaft. It is expected that it will be completed in a short time. At the Imperial Crown, which is controlled by the Crown Reserve, the surface is being trenched in a very thorough manner. A force of men has been working all summer, and the property has been cut into 100-foot squares with trenches. Several veins of calcite carrying some silver values have been located. On one of these veins at the west side of the property a shaft is down about 40 feet. Another shaft will shortly be started on a vein near the Kerr Lake-Majestic line. A diamond drill is working to try and locate the underlying Huronian slates.

In the Latour Lake district discoveries of silver have recently been made on the Lang-Caswell property and the Wright claim. The former has the greatest amount of work done of any mine in this section. The No. 1 shaft is down 75 feet, and sinking is still in progress. The vein in the bottom of the shaft is about 6 inches in width, and carries considerable cobalt. The discovery on the Wright property consists of a calcite vein carrying a good deal of smaltite with values in silver. So far but little work has been done, a test pit on the vein having been sunk only about 6 feet.

It is reported that the White Reserve Co., in the Maple Mountain district, will make a shipment of high-grade ore in September. This company has been in a position to make shipments for some time, but it deferred sending any ore out until it was in a position to ship continuously. The machinery on the property has now been all installed.

During the month of August there were shipped from 18 mines 81 cars of ore, aggregating 2,6064 tons. This is slightly

behind the July output, which was 85 cars, amounting to 2,715 tons.

At the 60-foot level of the Nancy Helen work was recommenced a short time ago on a vein which had been for some time abandoned. The drift was continued only a few feet toward the southeast when the vein widened and good values were found. When the work was started there was only about one inch of barren calcite, but this developed into about 3 inches of high-grade ore with values in the wall rock.

Underground work will shortly be resumed at the Drummond mine, and the main shaft is now being pumped out. During the summer a large force of men has been engaged in surface trenching, and a shaft is now being sunk at the southwest corner near the Silver Cross property. During the last few months the Drummond has been making large shipments of low-grade ore to Trout Mills.

Progress is being made on the Trethewey mill, and in a few days the concrete foundations will be finished. The mill will have thirty stamps, and will be able to handle about 80 tons a day. In order to connect it with the shafts, a small electric tramway will be built. This mine has a large tonnage of milling ore on the dumps.

At the 300-foot level of the Temiskaming mine good ore is still being obtained, the vein running from 6 to 12 inches in width of smaltite ore, carrying high values in native silver. A considerable amount of drifting has been done on this level, and a cross-cut is being run to cut some of the other veins. When the drift on No. 4 vein reaches the shaft, another winze will be sunk to the 300-foot level, and when this has been done the main shaft will also be sunk and connected up with the winze. The building for the crushing end of the new mill is completed, and it is expected that the machinery will be on hand and installed in a short time. Foundations for the concentrating end, distant about 300 feet from the shaft, are nearly finished.

Conditions at the Kerr Lake mine are steadily improving, and the amount of ore in sight has greatly increased in the last few months. So far veins Nos. 3 and 7 have been the principal producers, and the latter has been developed by a shaft to a depth of 190 feet, and the ore in the bottom of the work is as good as ever, and runs about 3,000 ounces to the ton. On the No. 3 vein the shaft is down 350 feet, and a winze is being sunk from the sixth level. The ore runs over 4,000 ounces to the ton. During the past month two new high-grade veins have been located underground, one of them at a depth of 160 feet. Two surface veins have also been recently located, and these both show values of over 1,000 ounces. When the winze from the sixth level is completed, it will be down 400 feet, and will be the deepest working in the camp. It is said that the cash on hand and ore in transit amounts to about \$800,000.

The trial of Angus McKelvie, vice-president of the Temiskaming & Hudson Bay Mining Co., held in North Bay on Sept. 4th, resulted in his being honourably acquitted. Mr. McKelvie was charged with having bribed John Piche to induce him to leave the country, so that his evidence in a suit brought by the Attorney-General's Department of Ontario against the T. & H. B., affecting their title, could not be given. Piche was one of the original discoverers of the Hudson Bay mine, and it was stated that at the time the claims were staked, a legitimate discovery such as was required by law, had not been made, and as a consequence application was made to the Attorney-General to have the company's rights to the property set aside. When the case came up, Piche, who was one of the principal witnesses, had disappeared. He was arrested on his return to New Liskeard a short time ago, and subsequently Mr. McKelvie was also arrested. The evidence showed that the money which passed between the two men was in settlement of a claim made by Piche against the Hudson Bay Co., and had nothing to do with the Attorney-General's suit.



The Station Grounds Mining Co. are diamond drilling under Cobalt Square in an effort to locate a vein which is supposed to be running east and west underneath that section of the town. The drill is operating from the Coniagas property, and will be in their territory for about fifty feet before it crosses the line.

A considerable amount of work is being done at the Victoria mine, and recent developments on a contact vein between the Keewatin and diabase at the 200-foot level have resulted in the discovery of niccolite with some silver values.

At the south end of Cross Lake a good deal of work is being accomplished on several of the properties there. The Eastern Township, formerly known as the Old Chap, is sinking on a big calcite vein. The shaft is down about 75 feet, and the work is being carried on with a small steam plant until compressed air can be obtained from one of the companies now coming into Cobalt. At the Silver Cross a new headframe is being put up, and when this has been completed the shaft will be timbered and sinking continued. A considerable amount of surface trenching is also being done. On the Belmont a force of men is prospecting the property, and a large calcite vein has been located. This has been cut by trenches in several places, and varies in width up to a foot. The Silver Lode Company are working with a small steam plant, and have a shaft down over 100 feet. When the 150-foot level is reached, cross-cuts will be started to explore the surrounding country.

The McKinley-Darragh will not rebuild the headframe at the Savage, which was destroyed by fire some time ago. The new shaft will be sunk another fifty feet, and from that point will be connected with the underground workings of the old shaft at the 75-foot level. At the last meeting of the directors held in Toronto it was decided to build a new office, laboratory and re-house at the property.

The name of the Silver Cross Mining Co. has been changed to that of Silver Cross Mines, Ltd. Good progress is being made in sinking the new shaft at the Lumsden mine, which is situated close to the Rochester. Air to run two drills has been obtained from the Temiskaming, and as a consequence sinking is progressing much more rapidly. The shaft is down about 75 feet, and when the 100-foot level is reached a cross-cut will be run to cut the vein, which dipped from the shaft a short distance below the surface. After the vein has been tested sinking will be continued to the 200-foot level, and from this point the management expect to carry on a considerable amount of work. From the main shaft of the Pan Silver in the same locality a cross-cut is being driven under the lake, and some good indications have been discovered. At the Columbus mine a good deal of work is being done at the 250-foot level.

The Rochester mine has been shut down on account of there being no money with which to carry on the work. A plan for the reorganization of the company is already under way, and it is understood that the new capitalization will be two million dollars. Part of the extra million will be sold to raise sufficient money to carry on development.

At the Cobalt Central operations are under way to open up a new level. This work will be in the Huronian slates, the development of which has given such satisfactory results to the company. A short time ago about sixty men went out on strike, owing to dissatisfaction with the quality of the food provided by the company. The management expect to fill the places of the strikers in a few days.

Cobalt is suffering from an epidemic of typhoid fever, and at the present time there are over 100 cases in the hospital. The hospital is not large enough to accommodate the number of patients, and tents have been put up behind the hospital, and others will be put up on the Coniagas property in a few days.

A good deal of blame is attached to the town authorities on account of the poor sanitary conditions existing in the town. About five per cent. of the population is down with fever.

Things are picking up in the Gowganda district, and the chances are that this fall and the coming winter will see a large increase in the amount of work being done. Several good discoveries have been made lately, which have been largely responsible lately for the optimistic tone now prevailing. A short time ago a new vein was found on the Mann property, and has been traced for 500 feet. It has also been traced for about 100 feet on the Boyd-Gordon. It will average about 4 inches in width, and carries a considerable quantity of native silver. Sinking has been stopped in the shaft while it is being timbered. On the Millen property, which adjoins the Mann, a 1-inch vein of very high-grade ore has been found. The Bartlett mines have the most up-to-date plant in the district, and their shaft is down about 115 feet. At the 100-foot level a cross-cut is being run to catch the vein, which dipped from the shaft at a depth of about 40 feet. At the Blackburn mine, which is said to be the best property in the whole of the Gowganda district, there is a tunnel in 125 feet on a 2-inch vein of high-grade ore. A shaft was sunk a short distance away from the vein, which it cut at the bottom at a depth of 80 feet. So far no drifting has been done from the shaft, as they have been bothered with water, and have been handling about 20,000 gallons a day with the bucket.

#### BRITISH COLUMBIA.

**Rossland.**—At the Le Roi mine the initial diamond drill work in the big development plan has been contracted for and work begun. The contract was let to O. L. Wright & Co., an energetic diamond drill contracting firm who have done much work in this district and the Boundary. No time will now be lost, and the work of opening the main vein at the Le Roi for another thousand feet will be energetically executed. It is likely that the work will entail the sinking of the main shaft a few hundred feet more. By doing this and some drifting it is thought better results could be obtained with the diamond drill on certain portions of the vein to be prospected. The probabilities are that this work will open up large quantities of gold ore similar to the lenticular deposit of \$100 ore taken out of the 1,650 level of the mine shortly before the shut-down. Mr. A. G. Larson, who has been superintendent of the Le Roi for some years, is in charge of the new work, and if application and a keen sense of the order of things underground have anything to do with it the present work will surely result favourably. The business end of Le Roi affairs here has been handled for the past several years by Mr. W. S. Rugh, who as office manager has got things about the mine down to an economical basis, and if it were not for the handicap that was placed on this mine in the extravagant days of the past, there is little doubt but that it would be working as a paying mine to-day, but as it is, the old mine not only has to pay its own way, but must give tribute to an incubus of debt fastened to it in days when the business was not as economically handled as it is to-day. The men who are interested here, however, look for brighter things in the future, as they do not think that Mr. Carlyle would have recommended the expenditure of a million dollars in developing the lower levels of the Le Roi unless the chances were very good for opening up large bodies of good ore.

There has been a change of management at the Le Roi 2, Ltd., Mr. Paul S. Couldrey, who has so ably managed the property for the last six years, leaving Rossland to take a position with the B. C. Copper Co., Ltd. Mr. Couldrey will be superintendent of the Mother Lode mine at Greenwood, and will no doubt do the same good work in that camp that he has done here with the Josie mine. While Mr. Couldrey has been in charge of the Le Roi 2, Ltd., the company has paid from four to eight shillings per share in dividends, having already paid four shillings during the present calendar year. Mr. Couldrey will be succeeded by Mr. Ernest Levy, a gentleman who has



been in charge of the work here at Rossland at one or two different times, and who, therefore, is not a stranger to the peculiar conditions attached to mining in this camp, nor is he a stranger to the Josie property and the methods of working it that have paid so well during late years. So, taking things as they look now, it is not likely there will be any radical change in the policy of the Le Roi 2, Ltd., at present, but that, with a few possible small changes, things will run along as they have for some time, at least.

Shipments from the Centre Star group keep up near the record mark for the year, and things are running along in an evenly balanced tenor. The mine is being run on an economical basis, mining, development and expansion being handled in a conservative yet aggressive manner by Mr. R. H. Stewart, the chief engineer, of the Consolidated M. & S. Co. of Canada. This company has recently acquired the Black Jack claim in Wellington camp, where the B. C. Copper Co. is opening up some new claims, and it is rumored that the Consolidated is behind the work being done on the No. 7 in Central camp, where the B. C. Copper Co. also has a good property with a lot of ore blocked out ready for shipment. A spur of the Canadian Pacific Railway will be run to tap these two camps in the near future, much of the preliminary work having already been done. The expansive policy of the Consolidated will assure a steady supply of ore for the Trail smelter and refinery, which is being gradually enlarged as the operations of the company increase.

**Phoenix.**—It is still anybody's guess how the shuffle of New Dominion Copper affairs will turn out, although it is practically assured a merger has been arranged, all but the final details. During the past week Mr. John Seward, of New York, arrived in the Boundary to take charge of the property of the New Dominion Copper Co. Mr. Seward expects to go over the ground carefully and consider just what policy can be adopted to place the property on a proper working basis. There is little doubt but that work will be resumed at the mines in a very short time, probably by the first of September, but it will likely be in the form of development for a short while, and the likelihood of the Boundary Falls smelter being blown in is small, although there is a possibility of the B. C. Copper Co. smelter having all it can do to handle the ore from its own mines, after the railway taps its Wellington and Central properties, so that the rumor that the New Dominion ore would be smelted at Greenwood may not mean that it will be smelted there permanently; that is, unless the hinted merger is consummated and the smelter at Greenwood is enlarged to take a greater tonnage. Of course, one of the furnaces is now being enlarged with a view to heavier operation, and it is no doubt the intention to enlarge the other two smelters in turn. One thing everyone here seems satisfied upon, and that is the mines will be worked, and that means progress for the district at large. What the details of the organization are will be of little moment so long as the mines and smelters are in operation and paying a profit.

A visit was paid to the property of the Dominion Copper Co. last week by B. W. Lincoln, of New York, who represents \$300,000 in stocks and bonds of dissenting shareholders in the old Dominion Copper Co. Mr. Lincoln says that his visit to the mines and to the coast is in connection with a plan he has in mind for obtaining from the new company certain rights which he thinks the old shareholders are entitled to.

The Snowshoe mine of the Consolidated broke another record for the week ending August 21st, shipping 4,430 tons to the smelter at Trail, B.C.

It is now authentically announced that the deal for the Nickel Plate mine of Hedley has been consummated. The Exploration Syndicate, behind which stand big Wall Street capitalists, has paid nearly one million dollars for the property. The property is now equipped with a 40-stamp mill and good mining equipment, but it is the intention of the new purchasers to augment both the milling and mining plants, and to work the property on a large scale. M. K. Rodgers, a local mining man of note, who has great faith in the Nickel Plate, and who was the one who brought this property to the attention of the late Marcus Daly, negotiated the sale. It is stated that Frank A. Ross, who has been acting as manager of the Nickel Plate for the past few years, will continue in that office under the new regime.

**Nelson.**—The hoodoo that follows the Silver King property at Nelson put in its appearance again the other day, when a fire destroyed the surface workings and part of the tramway, causing a cessation of work. It is too bad that the fire should occur at this time when things were just getting in good running order. This accident is almost enough to cause the lessees to wait until next spring before starting in again; although it is announced that the buildings will be renewed.

Another property has been acquired by J. S. Airheart, who is now successfully working the Highland-Buckeye property at Ainsworth. This recently acquired property is the United mine, which is situated not far from the Highland-Buckeye. The Highland mill is amply large enough, and will treat the ore from the United, as well as the others.

The air is full of the news of the acquirement of mining property in this district by capitalists from various parts of the country, and not only is the property changing hands, but work is being started. The large mines, which are the backbone of the district, are preparing for wider scope in the work of the near future, and are week after week breaking the preceding records of ore shipments for the year, so that it looks as though the next year or eighteen months, at least, would see a wonderful change in mining in this locality. Things may quieten a little this winter, but there is little doubt that next year will be a hummer, always provided we are bothered or hindered by strikes or car and fuel shortages, which is not likely, as conditions are fairly settled for a while anyway.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Amherst.**—The Maritime Coal, Railway and Power Company, head-quarters at Montreal, with principal mine at Joggins, Cumberland County, N.S., completed the installation of an endless haulage system on Sept. 2nd. This is a great improvement in facilitating the raising of coal from the pit. The output of No. 7 slope has already been increased from 250 to 1,500 tons,

and the new haulage system will increase the mine output six times the output under the old haulage. Senator Mitchell is president of the company. There is no sign of labor trouble at this colliery.

**Sydney Mines.**—The open-hearth furnaces of the N. S. Steel and Coal Company, which were closed for repairs during August, are now in commission once more.



**Sydney, Aug. 28.**—The Colonial Coal Company, which has re-opened the old Toronto mine at Little Bras D'Or, which has been closed down for over thirty years, announces that it will be shipping coal by the middle of September.

#### ONTARIO.

**Cobalt.**—A new vein was cut on the Foster recently, the second in three weeks. It is two inches wide and is mainly native silver.

**Cobalt.**—The Nova Scotia mill, it is estimated, will cost about \$100,000. It is claimed that, given a capacity of 75 tons per day, there is sufficient milling ore in sight to keep the mill running for four years.

**Port Arthur.**—The Dominion Bessemer Co., owning 6,000 acres of iron ore lands, 22 miles east of Port Arthur, and near Beck Siding on the C.P.R., is making arrangements for shipping ore. Mr. F. W. Goodrich is in charge of operations.

**South Lorrain.**—The first considerable shipment of high-grade ore from South Lorrain camp has just been completed. The Wettlaufer mine has just finished loading a car of firsts that will go by C. P. R. to Perth Amboy, from Mattawa and Prescott, the mine finding it to their advantage to ship down Lake Temiskaming and by C. P. R. rather than to Haileybury and over the T. & N. O. The car was of 50,900 pounds, and it is valued at \$25,959. The ore is stated to be 2,800 ounces. The ore was taken from the Wettlaufer in wagon for two and a half miles to 66, where it was put on scows and taken down the lake for transshipment to the C. P. R.

#### QUEBEC.

**Quebec.**—It is announced that the Provincial Government has determined to impose a royalty upon asbestos. What the new impost will amount to is not yet known.

**Montreal.**—The Amalgamated Asbestos Corporation, Limited, has decided to increase its rolling stock slightly. At the King Mine, Thetford Mines, and the British-Canadian Mines at Black Lake the rolling stock consists of eight locomotives and 220 cars. Two new saddle-tank locomotives have been ordered for the Beaver and Standard properties.

#### BRITISH COLUMBIA.

**Hedley.**—Under its new management the Nickel Plate mine is to be developed extensively. The mine has already yielded \$2,000,000 in gold.

**Rossland.**—On the Hattie Brown the project of diamond drilling has been temporarily abandoned, and, instead of doing this, cross-cuts are to be run from the bottom of the shaft in a northerly and southerly direction clear across the property for the purpose of tapping several ledges that run through the claim. The work of driving the cross-cuts will be let by contract.

The Le Roi Mining Co., Ltd., issued from its London office, on August 10th, the following notice to its shareholders: "The directors beg to inform the shareholders that the managing director has returned to British Columbia, and that the scheme of exploration and development outlined by W. A. Carlyle, the consulting engineer, is now being carried out at the mine. Any development of importance during the progress of this work will at once be communicated to the shareholders. Harold A. Wesson, secretary."

**Rossland.**—The Sappho group of five claims, two miles from Midway, has been bonded to the B. C. Copper Co. for \$20,000. The bond extends over 18 months.

**Rossland.**—Contracts for extensive diamond drilling on the Le Roi mine have been awarded to O. L. Knight & Co.

**Hedley.**—The Daly Reduction Company's mill and the Nickel Plate mine have been sold for a large figure. It is stated that J. J. Hill is interested in the transaction.

**Silverton.**—At the Vancouver mine the Van Roi Mining Co. are operating three shifts. In all, 70 men are employed. The concentrator will soon be working to full capacity.

**Phoenix.**—The Murex magnetic process is to be tried on the ores of the Vancouver mine at Silverton.

**Fernie, Aug. 31.**—A new town, to be called Carbondale, has been platted at a point on the railroad where the McGillivray Creek Coal & Coke Company are installing their plant, and houses will be built for the employees on easy terms by the Townsite Company.

Rumor has it that the entire output of this coal mine has been contracted for by one of the new transcontinental railroads.

This company's holdings represent a total of 2,600 acres of coal land, lying directly north of the Canadian Railway tracts. The property is estimated by engineers to contain a large tonnage of coal. The machinery is fast being installed by the McGillivray Creek people, and construction of coke ovens will begin early this autumn.

## MINING NEWS OF THE WORLD.

#### GREAT BRITAIN.

The Scottish coal market was at least fairly active throughout the first three weeks of August. Complaints are coming in from coal miners, to the effect that they cannot obtain sufficient employment to enable them to earn the minimum day's wage, 6 shillings.

At a conference of labour delegates representing the twenty colliery districts of Mid-Lothian and Haddingtonshire, held on August 14th, at Dalkeith, Secretary Brown stated that securing the 6s. minimum wage was one of the greatest events in the

history of the Scottish coal trade. He declared that this was but a step towards securing a rate of 1 shilling per hour.

#### SOUTH AFRICA.

Under the supervision of Mr. R. B. Ballantine, the inventor and patentee of the process, the South African Cyanide Company is carrying on experimental work with a view to establishing a manufactory in Johannesburg. Mr. Ballantine's methods have been much criticized.

## AUSTRALIA.

The production of coal in Australia for the year 1907 has just been published. The total tonnage was 9,681,095 tons, valued at £3,302,974. New South Wales was incomparably the largest producer. Its output was 8,657,924 tons. South Australia furnished no coal. The total exports amounted to 5,748,507 tons, valued at £2,662,218. In 1857, the average value of Australian coal was 11s. 10d. Rising in the following year to 15s., the price declined steadily, until in 1871 it stood at 7s. After various fluctuations, ranging from 5s. 4d. to 12s., the average price in 1907 settled at 6s. 3d., although the actual prices current in individual states varied greatly.

## UNITED STATES.

According to the official figures of the Coalinga Oil Producers' Agency, California produced 5,100,000 barrels of oil during July; 477 producing wells contributed to this total. There were 112 well drilling, and 47 new rigs being erected.

Electric power is to be introduced into the mines of Butte, Montana. It is expected that this will bring costs of production down by one-third of a cent per pound. Fuel and supplies have to be hauled uphill for several miles at some of the mines. The saving in these instances will be marked.

Indiana coal production is looking up. The domestic demand is strong. Many of the mines are working full time.

At the Copper Queen, Bisbee, Arizona, a new precipitating plant has been erected. Wooden pegs have been substituted for nails. Nails were used in the former outfit, but their corrosion caused the collapse of the plant. The plant is designed for the recovery of copper from the mine waters by precipitation by scrap iron.

## Company Notes.

On September 1st the directors of the Dominion Iron & Steel Company declared a dividend of 7 per cent. on the preferred stock. This is payable October 1st. President Plummer pointed out that this was to be paid out of earnings, as no final settlement had yet been reached with the Dominion Coal Company. There still remains 28 per cent. due on the preferred stock.

## KERR LAKE AUGUST REPORT.

The report of the Kerr Lake Mining Company shows its financial condition as of August 25 is as follows: Cash on hand, \$380,600; 95 per cent. of estimated value of silver contents for shipment of ore delivered but not settled for, 331,579 ounces; 95 per cent. of estimated contents of shipment of ore in transit, on hand, 20,000 pounds at 2,000 ounces to 336,500 ounces; 97 per cent. of vein 7 ore ton 19,000 ounces; vein 3 ore on hand, 20,000 pounds, 3,000 ounces, 28,500 ounces; total, 715,579 ounces, at 50 cents, \$637,780; total, \$728,479.

A statement issued by the Empire Zinc Company, of Denver, Co., shows that of 38 cars of Lucky Jim (Kaslo, B.C.) ore shipped to that company's plant, the lowest value per ton was \$26.56 and the highest \$32.33.

The highest total value of the ore per car was \$1,407.13 and the lowest was \$778.73.

The highest amount of freight per car was \$391.60, and the lowest \$264.

The highest amount received by the mining company per car was \$1,014.65, and the lowest \$514.73.

The net value of the 38 cars was \$25,152.11, and the average value per car was \$635.58.

## STATISTICS AND RETURNS.

The official estimate of the Dominion Coal Company's output for Saturday is 9,061 tons, made up of 6,073 tons from the mines, and 2,988 tons from the banking stations.

## COBALT ORE SHIPMENTS.

There were eight shippers among the Cobalt mines last week, but the figures are not as lucid as they might be, one shipment of 636,410 pounds of ore being credited to the Carnegie Company, a smelting company in Pennsylvania, to whom the ore was sent instead of to the mine producing the ore. Shipments for the week and year (in pounds of ore) are:—

|                            | Week<br>Aug. 30. | Year<br>to date. |
|----------------------------|------------------|------------------|
| Buffalo . . . . .          |                  | 791,028          |
| Carnegie . . . . .         | 63,410           | 63,410           |
| Chambers-Ferland . . . . . |                  | 961,010          |
| City of Cobalt . . . . .   |                  | 1,002,522        |
| Cobalt Central . . . . .   |                  | 558,344          |
| Cobalt Lake . . . . .      |                  | 79,960           |
| Coniagas . . . . .         |                  | 1,043,315        |
| Crown Reserve . . . . .    | 124,000          | 4,182,719        |
| Drummond . . . . .         |                  | 920,000          |
| Kerr Lake . . . . .        |                  | 1,422,026        |
| King Edward . . . . .      |                  | 183,740          |
| La Rose . . . . .          | 193,020          | 8,374,233        |
| McKinley . . . . .         | 40,980           | 1,278,536        |
| Nipissing . . . . .        | 255,170          | 8,841,763        |

|                                    |                   |
|------------------------------------|-------------------|
| Nancy Helen . . . . .              | 83,400            |
| Nova Scotia . . . . .              | 380,810           |
| O'Brien . . . . .                  | 129,640 1,759,402 |
| Peterson Lake . . . . .            | 281,110           |
| Right of Way . . . . .             | 60,310 2,134,891  |
| Silver Queen . . . . .             | 598,395           |
| Silver Cliff . . . . .             | 123,820           |
| Temiskaming . . . . .              | 2,046,060         |
| Trethewey . . . . .                | 66,000 1,362,698  |
| Temiskaming & Hudson Bay . . . . . | 1,106,260         |
| Muggsley Consolidated . . . . .    | 72,900            |

## COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending September 4, and those from January 1, 1909, to date:—

|                            | Since<br>Sept. 4.<br>Ore in lbs. | Jan. 1.<br>Ore in lbs. |
|----------------------------|----------------------------------|------------------------|
| Buffalo . . . . .          | 41,640                           | 832,668                |
| Carnegie . . . . .         |                                  | 63,410                 |
| Chambers-Ferland . . . . . |                                  | 961,010                |
| City of Cobalt . . . . .   | 40,000                           | 1,042,522              |
| Cobalt Central . . . . .   |                                  | 558,784                |
| Cobalt Lake . . . . .      |                                  | 79,960                 |
| Coniagas . . . . .         | 110,170                          | 1,153,485              |
| Crown Reserve . . . . .    | 60,730                           | 4,243,449              |



|                                    |                   |
|------------------------------------|-------------------|
| Drummond . . . . .                 | 920,000           |
| Kerr Lake . . . . .                | 60,130 1,482,156  |
| King Edward . . . . .              | 183,740           |
| La Rose . . . . .                  | 390,500 8,764,733 |
| McKinley-Darragh . . . . .         | 104,760 1,383,296 |
| Nipissing . . . . .                | 458,480 9,291,243 |
| Nova Scotia . . . . .              | 480,810           |
| Nancy Helen . . . . .              | 83,400            |
| Peterson Lake . . . . .            | 42,930 324,040    |
| O'Brien . . . . .                  | 71,700 1,831,102  |
| Right of Way . . . . .             | 2,154,891         |
| Silver Queen . . . . .             | 598,395           |
| Silver Cliff . . . . .             | 123,820           |
| Temiskaming . . . . .              | 1,506,060         |
| Trethewey . . . . .                | 1,362,698         |
| Temiskaming & Hudson Bay . . . . . | 1,106,260         |
| Muggley Consolidated . . . . .     | 72,900            |

Ore shipments to Sept. 4 from Jan. 1 are 40,604,832 pounds, or 20,302 tons. Total shipments for week ending Sept. 4 are 381,040 pounds, or 690 tons.

#### BRITISH COLUMBIA ORE SHIPMENTS.

Nelson, Aug. 21.—Appended are the ore shipments and smelter receipts in detail for the past week and year to date:—

##### Ore Shipments.

| Boundary—             | Week.  | Year.   |
|-----------------------|--------|---------|
| Granby . . . . .      | 19,592 | 624,731 |
| Snowshoe . . . . .    | 3,583  | 82,226  |
| Mother Lode . . . . . | 6,840  | 155,396 |
| Other mines . . . . . |        | 2,122   |
| Total . . . . .       | 20,015 | 864,465 |

##### Rossland—

|                                 |       |         |
|---------------------------------|-------|---------|
| Centre Star . . . . .           | 3,731 | 111,807 |
| Le Roi No. 2 . . . . .          | 712   | 19,863  |
| Le Roi No. 2 (milled) . . . . . | 260   | 19,863  |
| Other mines . . . . .           |       | 9,561   |

Total . . . . . 4,703 139,651

##### Slocan-Kootenay—

|                                    |     |        |
|------------------------------------|-----|--------|
| Queen (milled) . . . . .           | 420 | 13,650 |
| Granite Poorman (milled) . . . . . | 250 | 8,100  |
| Whitewater Deep (milled) . . . . . | 700 | 22,900 |
| Kootenay Bell (milled) . . . . .   | 70  | 2,280  |
| Second Relief (milled) . . . . .   | 145 | 4,715  |
| Nugget (milled) . . . . .          | 110 | 3,580  |
| Bluebell (milled) . . . . .        | 900 | 29,300 |
| St. Eugene . . . . .               | 252 | 13,731 |
| Silver King . . . . .              | 229 | 2,521  |
| Van Roi . . . . .                  | 83  | 514    |
| Bluebell . . . . .                 | 55  | 3,177  |
| Second Relief . . . . .            | 19  | 239    |
| Wellington . . . . .               | 9   | 29     |
| Eastmount . . . . .                | 24  | 24     |
| Ferguson . . . . .                 | 67  | 98     |
| Emerald (Iron Mt.) . . . . .       | 36  | 36     |
| Whitewater . . . . .               | 21  | 756    |
| Northern Light . . . . .           | 3   | 3      |
| Yankee Girl . . . . .              | 69  | 1,364  |
| Other mines . . . . .              |     | 12,576 |

Total . . . . . 3,462 119,593

The total shipments for the week were 38,180 tons, and for the year to date 1,133,709 tons.

##### Smelter Receipts.

|                                       | Week.  | Year.     |
|---------------------------------------|--------|-----------|
| Granby, Grand Forks . . . . .         | 19,592 | 625,181   |
| Consolidated, Trail . . . . .         | 8,949  | 248,246   |
| B. C. Copper Co., Greenwood . . . . . | 6,840  | 156,879   |
| Le Roi, Northport . . . . .           |        | 12,761    |
| Total . . . . .                       | 35,381 | 1,043,067 |

#### BRITISH COLUMBIA ORE SHIPMENTS.

Nelson, Aug. 28.—The ore shipments and smelter receipts for the past week were about average of the year to date. The details follow:—

##### Ore Shipments.

| Boundary—             | Week.  | Year.   |
|-----------------------|--------|---------|
| Granby . . . . .      | 18,688 | 643,419 |
| Snowshoe . . . . .    | 3,729  | 85,955  |
| Mother Lode . . . . . | 7,182  | 162,578 |
| Other mines . . . . . |        | 2,122   |

Total . . . . . 29,599 894,064

##### Rossland—

|                                 |       |         |
|---------------------------------|-------|---------|
| Centre Star . . . . .           | 3,183 | 114,990 |
| Le Roi No. 2 . . . . .          | 891   | 20,754  |
| Le Roi No. 2 (milled) . . . . . | 260   | 8,680   |
| Other mines . . . . .           |       | 9,561   |

##### Slocan-Kootenay—

|                                    |       |         |
|------------------------------------|-------|---------|
| Queen (milled) . . . . .           | 420   | 1,470   |
| Total . . . . .                    | 4,334 | 153,985 |
| Granite Poorman (milled) . . . . . | 250   | 8,350   |
| Whitewater Deep (milled) . . . . . | 700   | 23,600  |
| Kootenay Belle (milled) . . . . .  | 70    | 2,350   |
| Second Relief (milled) . . . . .   | 145   | 4,660   |
| Nugget (milled) . . . . .          | 110   | 3,690   |
| Blue Bell . . . . .                | 900   | 30,200  |
| St. Eugene . . . . .               | 356   | 14,087  |
| Bluebell . . . . .                 | 45    | 3,322   |
| Queen . . . . .                    | 47    | 439     |
| North Star . . . . .               | 204   | 1,130   |
| Rambler-Cariboo . . . . .          | 61    | 600     |
| Yankee Girl . . . . .              | 105   | 1,469   |
| Emerald . . . . .                  | 45    | 698     |
| Whitewater . . . . .               | 21    | 777     |
| Cord . . . . .                     | 17    | 237     |
| Granite-Poorman . . . . .          | 37    | 325     |
| Other mines . . . . .              |       | 12,922  |

Total . . . . . 3,533 123,126

The total shipments for the week were 37,666 tons, and for the year to date, 1,171,175 tons.

##### Smelter Receipts.

|                                       | Week.  | Year.   |
|---------------------------------------|--------|---------|
| Granby, Grand Forks . . . . .         | 18,688 | 642,869 |
| Consolidated, Trail . . . . .         | 8,741  | 256,987 |
| B. C. Copper Co., Greenwood . . . . . | 7,182  | 164,061 |
| Le Roi, Northport . . . . .           |        | 12,761  |

Total . . . . . 34,611 1,077,678

The total output of gold from Rhodesia for the month of July is cabled as 53,511 ozs., valued at £225,234, as against 51,78 ozs., valued at £217,600, in the previous month. This is an increase on the month of £7,634. There were 225 gold producers last month. The output of other minerals for last month was: Silver, 23,341 ozs.; lead, 92 tons; coal, 15,113 tons; copper, 7 tons; chrome ore, 2,240 tons, asbestos, 25 tons.

### PIG IRON PRODUCTION.

Ten-year totals (tons of 2,240 lbs.):—

|               |             |
|---------------|-------------|
| 1868-77 ..... | 19,984,735  |
| 1878-87 ..... | 42,484,217  |
| 1888-97 ..... | 82,236,958  |
| 1898-07 ..... | 181,470,757 |

Annual totals:—

|            |            |
|------------|------------|
| 1901 ..... | 15,878,354 |
| 1902 ..... | 17,821,307 |
| 1903 ..... | 18,009,252 |
| 1904 ..... | 16,497,033 |
| 1905 ..... | 22,992,380 |
| 1906 ..... | 25,307,191 |
| 1907 ..... | 25,781,361 |
| 1908 ..... | 15,936,018 |

Annual rate during

|                                             |            |
|---------------------------------------------|------------|
| First half, 1908 .....                      | 13,850,000 |
| Second half, 1908 .....                     | 17,900,000 |
| January, 1909 .....                         | 21,508,000 |
| February .....                              | 22,600,000 |
| March .....                                 | 21,963,000 |
| April .....                                 | 21,500,000 |
| May .....                                   | 22,518,000 |
| June .....                                  | 23,835,000 |
| July .....                                  | 25,087,000 |
| Prospect for 1909, continuing July rate.... | 23,670,000 |

### METAL STATISTICS.

The statistics formerly compiled by the Metallurgische Gesellschaft, of Frankfort-on-Main, now issued jointly by the Bergwerks and Metallbank and the Metallgesellschaft, give the world's output of the four leading metals for the last three years, as follows, in metric tons:—

|               | 1906.   | 1907.   | 1908.     |
|---------------|---------|---------|-----------|
| Lead .....    | 973,100 | 984,300 | 1,052,500 |
| Copper .....  | 717,800 | 703,000 | 738,900   |
| Spelter ..... | 702,000 | 738,400 | 722,100   |
| Tin .....     | 98,800  | 97,700  | 106,500   |

In all cases the output shows steady growth, which is most pronounced in the case of copper, and least so in that of lead, the average yearly increase during the past decade having been as follows: Lead, 2.7 per cent.; copper, 4.5 per cent.; spelter, 4 per cent.; and tin, 3.9 per cent.

A very interesting summary of consumption is included in the statistics, the countries dealt with being Germany, Great Britain, France, and the United States, and from this the following details are abstracted, the figures representing metric tons and applying to the year 1908:—

|                      | Lead.    |
|----------------------|----------|
| United States .....  | 321,000  |
| Germany .....        | 211,300  |
| United Kingdom ..... | 228,800  |
| France .....         | 103,000  |
|                      | Copper.  |
| United States .....  | 210,600  |
| Germany .....        | 180,700  |
| United Kingdom ..... | 128,900  |
| France .....         | 73,900   |
|                      | Spelter. |
| United States .....  | 188,300  |
| Germany .....        | 180,200  |
| United Kingdom ..... | 138,500  |
| France .....         | 78,000   |

|                      | Tin.   |
|----------------------|--------|
| United States .....  | 32,800 |
| Germany .....        | 16,700 |
| United Kingdom ..... | 19,000 |
| France .....         | 7,600  |

The outstanding feature of the returns is the enormous preponderance of the United States as a consuming country and the comparative insignificance of France.

### TORONTO MARKETS.

#### Metals.

Sept. 8.—(Quotations from Canada Metal Co., Toronto.)

Spelter, 5½ to 5¾ cents per lb.

Lead, 3.40 to 3.50 cents per lb.

Antimony, 8 to 9 cents per lb.

Tin, 32 cents per lb.

Copper, casting, 13¾ cents per lb.

Electrolytic, 13.75 cents per lb.

Ingot brass, 9 to 12 cents per lb.

Sept. 8.—Pig Iron.—(Quotations from Drummond, McCa Co.)

Summerlee, No. 1, \$23 (f.o.b. Toronto).

Summerlee, No. 2, \$22.50 (f.o.b. Toronto).

Midland, No. 1, \$21 (f.o.b. Toronto).

Coal—Anthracite, \$5.50 to \$6.75.

Bituminous, \$3.50 to \$4.50 for 1¼-inch lump.

#### Coke.

Sept. 3.—Connellsville coke, f.o.b. ovens:—

Furnace coke, prompt, \$1.90 to \$2.00 per ton.

Foundry coke, prompt, \$2.15 to \$2.40 per ton.

Sept. 3.—Tin (Straits), 30.45 cents.

Copper, prime.Lake, 13.00 to 13.10 cents.

Electrolytic copper, 12.90 to 13.00 cents.

Copper wire, 15.00 cents.

Lead, 4.37½ to 4.40 cents.

Spelter, 5.70 to 5.80 cents.

Sheet zinc, 8.00 cents.

Antimony, Cookson's, 8.50 to 8.62½ cents.

Aluminium, 23.00 to 24.00 cents.

Nickel, 40.00 to 47.00 cents.

Platinum, \$24.50 to \$28.25 per oz.

Bismuth, \$1.75 per lb.

Quicksilver, \$43.00 to \$43.50 per 75-lb. flask.

### SILVER PRICES.

|                  | New York. | London.  |
|------------------|-----------|----------|
|                  | Cents.    | Pence.   |
| August 19.....   | 50¾       | 23 7-16  |
| " 20.....        | 51        | 23½      |
| " 21.....        | 51        | 23½      |
| " 23.....        | 51        | 23½      |
| " 24.....        | 51½       | 23 9-16  |
| " 25.....        | 51¼       | 23¾      |
| " 26.....        | 51¾       | 23 13-16 |
| " 27.....        | 51¾       | 23 13-16 |
| " 28.....        | 51½       | 23¾      |
| " 30.....        | 51¾       | 23¾      |
| " 31.....        | 52        | 24       |
| September 1..... | 51¾       | 23¾      |
| " 2.....         | 51¾       | 23¾      |
| " 3.....         | 51½       | 23¾      |



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In general arrangement Volumes III and IV are similar to Volumes I and II. The Chapters are each intended to supplement the subject-matter of the corresponding chapters in the earlier volumes, describing new machines, new processes, and giving new data. The greatest care has been exercised in avoiding repetition.

Since the issue of the earlier volumes, many important discoveries have been made and radical departures introduced in established processes. Volume III, for example, has complete discussions of fine grinders, particularly the tube mill and grinding pans, rectilinear tables of the Wilfley type, the questions of magnetic separation, electrostatic separation, the flotation processes, and other subjects of like importance not covered in the earlier volume.

When Volume I was issued, the tube mill, which has almost revolutionized gold and silver milling practice, was

hardly touched upon. The Wilfley table was just finding its place among mills, and a number of other tables of the same type have been developed since.

Volume IV describes in detail some 94 complete mills, showing the most approved modern and successful methods of applying ore-dressing principles in use to-day throughout the mining districts of the world. Comparisons are made with earlier descriptions to show modifications and improvements, and to point out errors in older plants.

Throughout both volumes, much space and great care have been devoted to the general subjects of costs of operation, speed, capacity, water power, life of machines, etc. Power and water plants are described in connection with nearly every mill.

Complete Bibliographies are added. The Index for the entire four volumes has been remade and will be bound separately. It will be furnished without charge to purchasers of Volumes III and IV.

Book Dept. Canadian Mining Journal - Toronto



# PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

## ENGINEERS, METALLURGISTS AND GEOLOGISTS

| Dominion of Canada                                                                                                                  | Quebec                                                                                                                                         | British Columbia                                                                |
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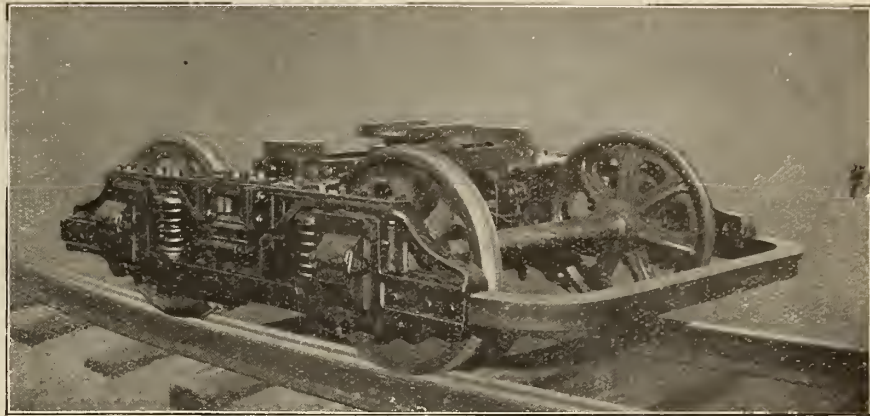
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A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

**General Passenger Department, Intercolonial Railway**  
**MONCTON, N.B.**

# Westinghouse Motors for Mines

Westinghouse Mine Motors are noted for great strength of parts, large self-oiling bearings that seldom need attention, large overload capacity, low operating temperature and high efficiency.

We illustrate a Westinghouse Induction Motor driving a Deep Mine Sinking Pump. Westinghouse Alternating and Direct Current Motors are fully described in Circulars 1068 and 1118; ask for copies.



## Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg.,  
TORONTO.  
439 Pender Street,  
VANCOUVER.

Address nearest office:  
HAMILTON.  
922-923 Union Bank Bldg.,  
WINNIPEG.

252 St. James Street,  
MONTREAL.  
158 Granville Street,  
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## HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.

### NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

### "WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. It does not freeze, or rather, explodes with perfect efficiency when frozen and needs no thawing.

### "AUTUMN BRAND" DYNAMITE

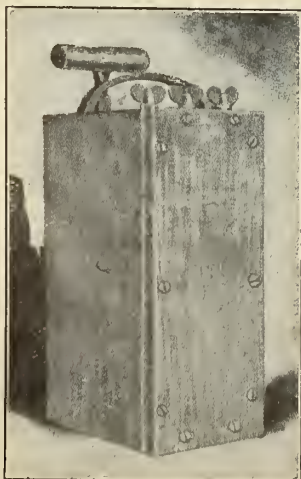
Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

### PERMITTED EXPLOSIVES for Coal Mines

Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

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Three Post Magneto Electric Blasting Machine

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# THE FINEST MINERS' TOOLS

ARE  
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INTERCHANGEABLE

"Universal" Picks

They cut more Coal in less Time than any others  
and last longer

SHEFFIELD STEEL THROUGHOUT  
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BORING MACHINES

For HAND POWER, for ROCK and COAL  
Fitted with Quick-Change Nuts and Automatic Feed



THE "UNIVERSAL."

The HARDY PATENT PICK CO., Ltd.  
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Stocks of our Universal Picks and Headed Shafts kept by Messrs. Mussels Ltd.,  
299 St. James Street, Montreal,

THERE ARE OTHERS, BUT WE KNOW

## "Cleveland" Stoping Drills

Will give you the best results of all. If you are skeptical,  
give us shipping directions, and we will send you one on  
30 days' trial, so you can

## Find Out What They Will Do

in your own mine,—or better still, buy one machine and  
keep a record of amount of Drilling, time laid up for repairs  
and cost of repairs, (if any) and then compare these records  
with similar ones kept of any other stoper. If you will do  
this, we feel sure that when you are ready to order  
more equipments

We Will Get Your Order.

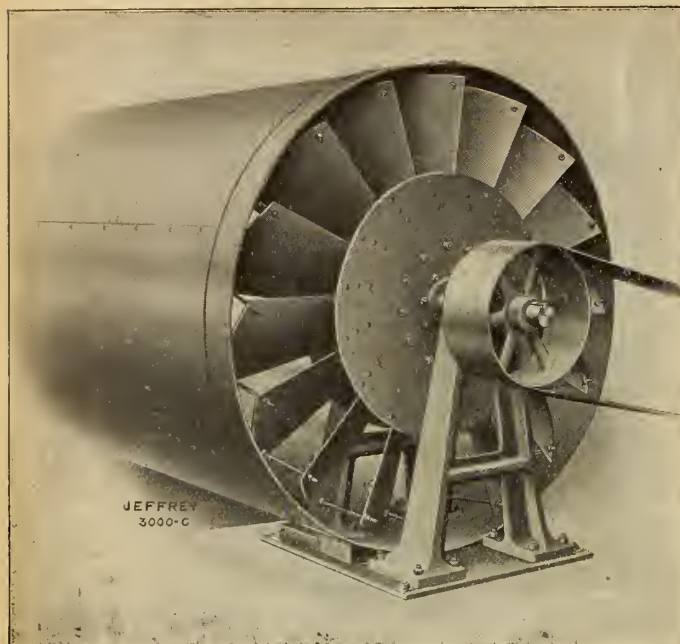
Bulletin 40-A with full information mailed on request.

The Canadian-Cleveland Drill Co., Ltd.  
Cobalt, Ontario.

ROCK DRILLS, PNEUMATIC TOOLS, HOSE, DRILL STEEL, ETC.







## Jeffrey Propeller Fan for Mine Ventilation

This fan is highly recommended wherever the development does not justify the installation of our centrifugal fan.

It has no equal for boosting along feeble currents in large operations.

### A DISTINCT IMPROVEMENT OVER THE ORDINARY DISC FAN

It is self contained, simple in operation and embodies many new features which are described in our Bulletin X23, mailed on request.

We Build

COMPLETE COAL MINE AND TIPPLE EQUIPMENTS

## THE JEFFREY MANUFACTURING COMPANY

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MACHINERY  
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| COAL MINING MACHINERY                                                                                                                                                                                                                                                                                                                                                               |                               |                                     |
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| ELECTRIC CHAIN ROOM AND PILLAR MINING MACHINES                                                                                                                                                                                                                                                                                                                                      |                               |                                     |
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| <p><b>SULLIVAN MACHINERY CO.</b></p> <p>Birmingham, Ala.<br/>Butte, Mont.<br/>Cuba, Ont.<br/>Claremont, N. H.<br/>Denver<br/>El Paso<br/>Joplin, Mo.<br/>Knoxville<br/>New York</p> <p><b>RAILWAY EXCHANGE<br/>CHICAGO, ILLINOIS</b></p> <p>Salt Lake<br/>San Francisco<br/>Seattle<br/>Spokane<br/>St. Louis<br/>Sydney, N. S. W.<br/>Paris, France<br/>Pittsburg<br/>Portland</p> |                               |                                     |

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CONCENTRATES

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Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.

To Date **34** Lives Saved by Its Use



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**EXPLOSIONS  
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MINE FIRES**

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The latest model Helmet fitted with Electric Head Light.

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**"Little Giant"**

## Rock Drills

☐ Built in sizes ranging from 2" to 5½" Cylinder diameter, for all work from boulder breaking to submarine drilling.

☐ Our claim that the Rand drill is the best in the market is proven by the sale of more of this type than of all other makes combined.

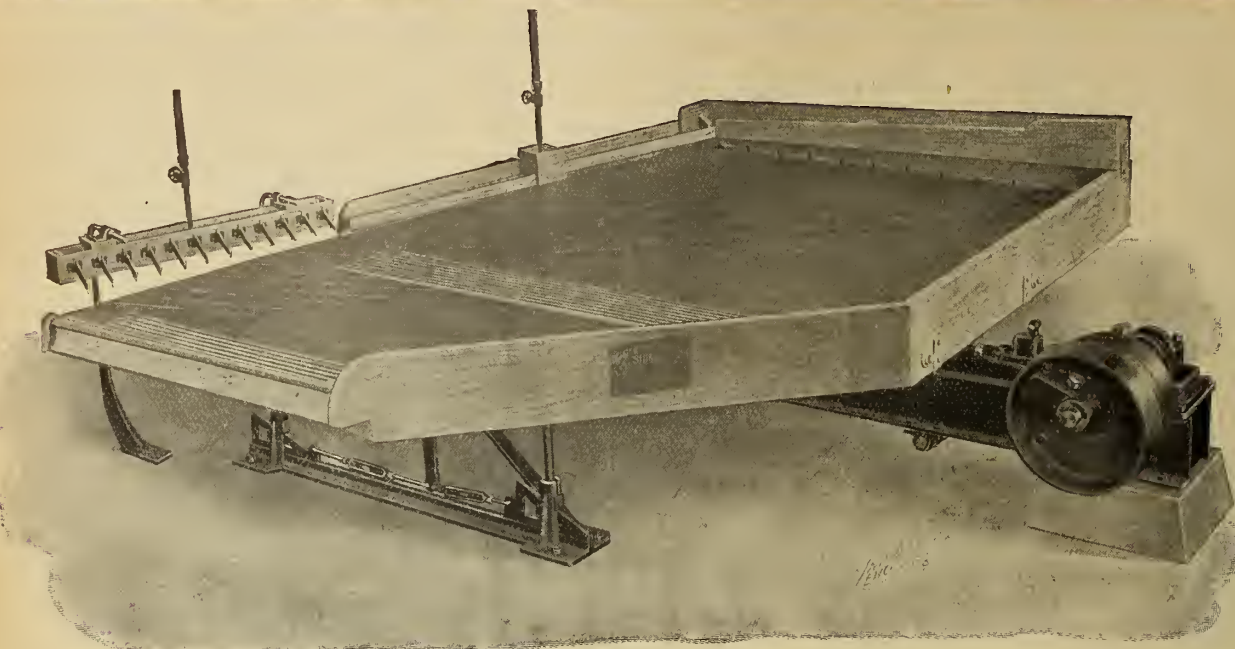
☐ Prices and catalog on request, or ask to have one of our representatives call.

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**Montreal, Canada**

**TORONTO, COBALT, HALIFAX, WINNIPEG, ROSSLAND, MONTREAL.**

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## The Improved No. 3 Deister Slime Table

Is another step forward in the concentration of slimes. Embodying the same general principles as our No. 3 table, the improved mechanical construction has enabled us, in actual mill operation, to make a greater saving with less attention and repairs.

**EMIL DEISTER,**

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ESTABLISHED, 1867

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A. LAIRD,  
General Manager

PAID-UP CAPITAL \$10,000,000 REST \$6,000,000

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**\$10, \$20, \$50, \$100 and \$200**

and the exact amount payable in **Austria, Belgium, Denmark, France, Germany, Great Britain, Holland, Italy, Norway, Russia, Sweden and Switzerland** is stated on the face of each cheque, while in other countries they are payable at current rates.

The cheques and all information regarding them may be obtained at every office of the Bank.

Branches at **Cobalt, Elk Lake, Cowganda, and Latchford** in the silver mining camp of New Ontario and throughout Canada; also in the United States and England.

## The Canadian Laboratories

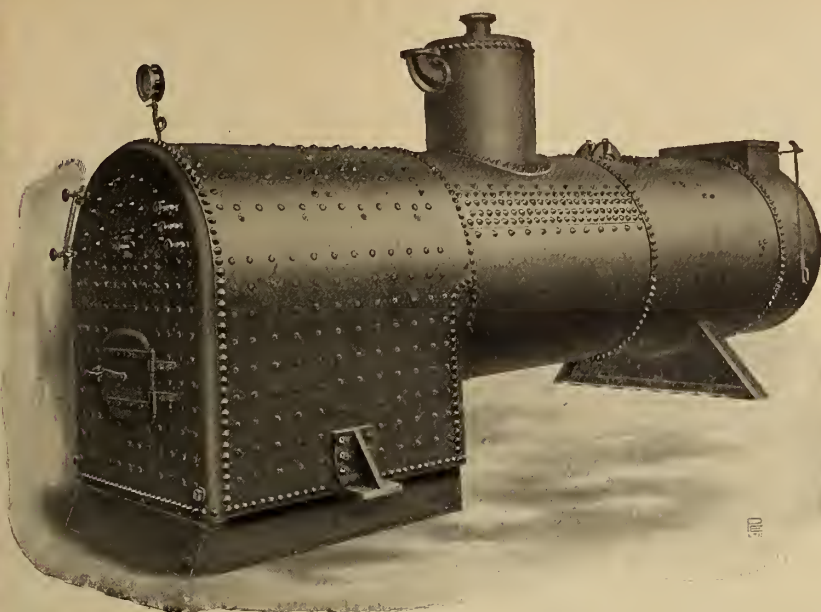
Chemical and Physical tests  
of all Materials.

Mining properties examined  
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Write for prices for  
Ore analysis.

**37 Melinda St. Toronto**





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Locomotive Portable  
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ASK FOR OUR LIST OF  
BOILERS ON STOCK WITH  
PRICES

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GALT, - ONTARIO, - CANADA

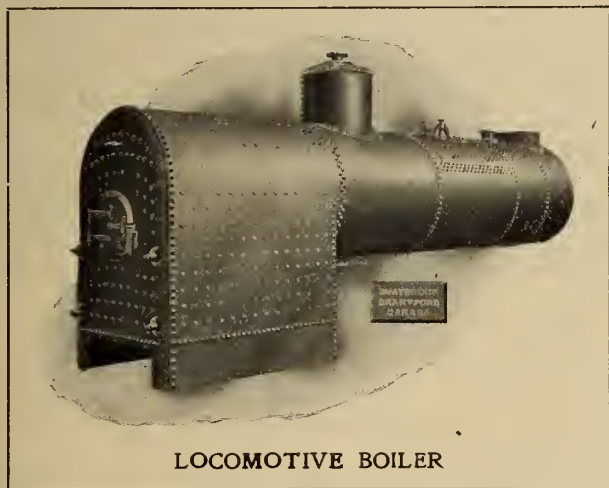
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LOCOMOTIVE BOILER

Write for our List of Boilers  
in Stock for immediate ship-  
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Locomotive  
Plain Vertical  
Portable  
Return Tubular Fire Box

**SHEET IRON and TANK WORK,  
BURNERS, HEATERS, ROCK  
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**THE WATEROUS ENGINE WORKS CO., LTD.**

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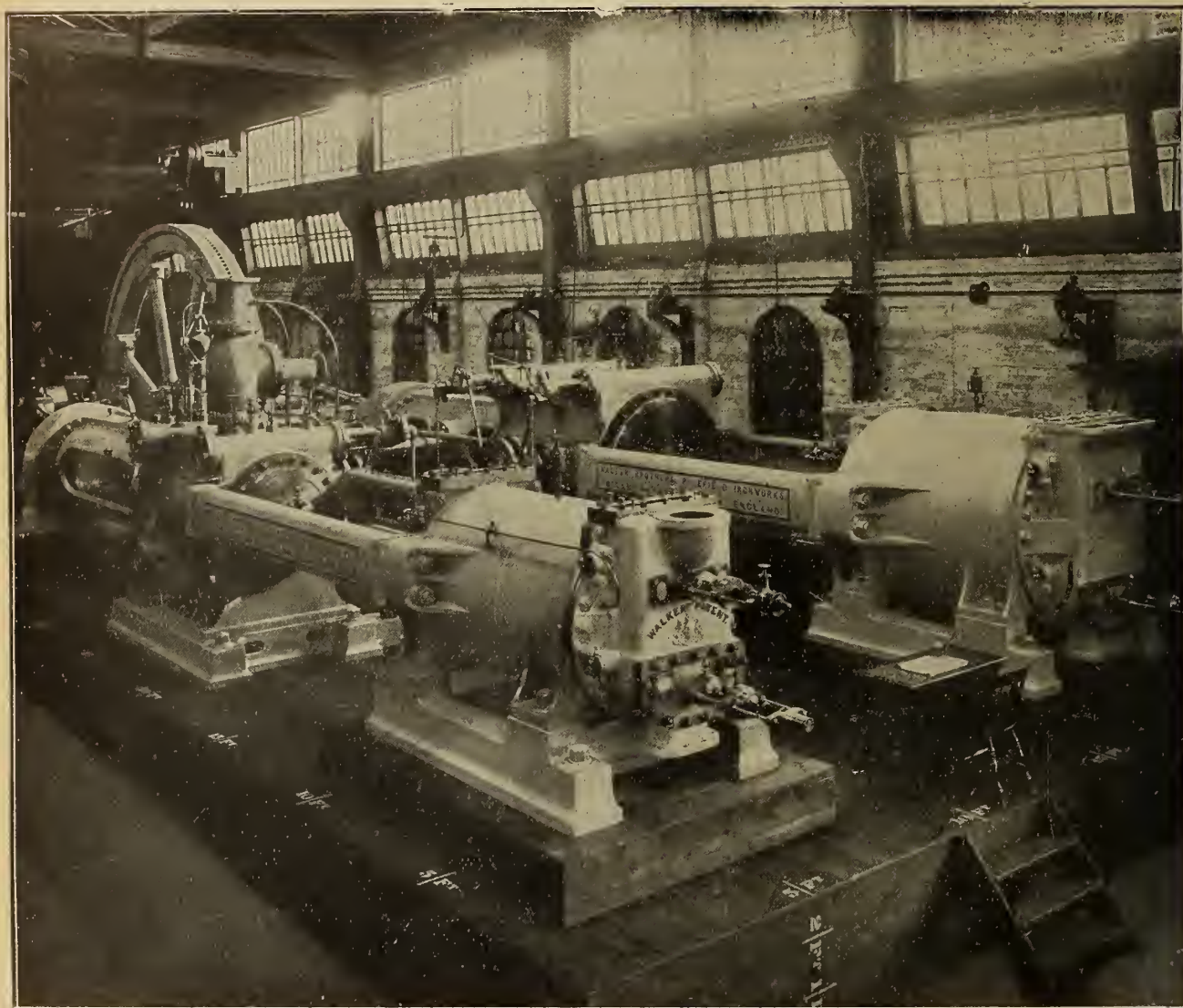
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## Wigan, England



## Largest Air Compressors in Canada

are of **WALKER BROTHERS (Wigan) LIMITED** manufacture.

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES**.

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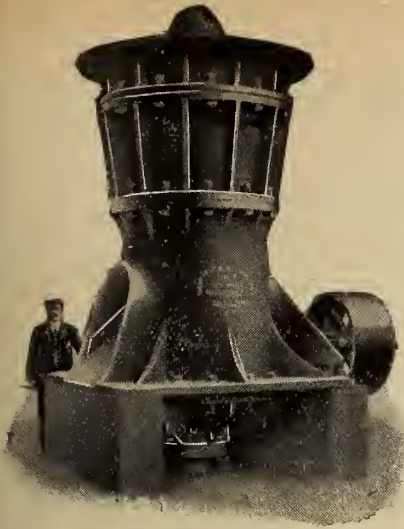
SOLE CANADIAN  
REPRESENTATIVES

## PEACOCK BROTHERS

68 BEAVER HALL HILL,  
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**CRUSHING AND GRINDING MACHINERY**  
of every description.

## HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for  
Tramway Track-work and parts of machinery subject to great abrasive strain.

## Steel Castings for Collieries, Mines, etc.,

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## FOR DYNAMITE, ROCK-CHIEF AND ALL KINDS OF BLASTING SUPPLIES

QUALITY UNSURPASSED  
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CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

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DANIEL SMITH, President.

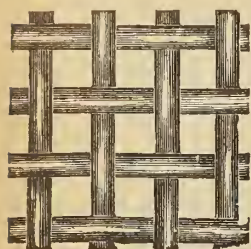
C. A. MACPHERSON, Sec.-Treas.

## Bound Volumes For Sale

The book department of the Canadian Mining Journal has a limited number of complete bound volumes of the Canadian Mining Journal (including index) for the years 1907 and 1908 for sale. Anyone wishing one or both of these volumes should apply at once to secure his order. The price is \$5.50 per volume or the two volumes for \$10.00.

Book Department, Canadian Mining Journal  
313 Confederation Life Building, Toronto

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Perforated  
Steel Wire

FOR MINERS AND EVERY OTHER USE.

*Write for Special Catalogue.*

**The B. GREENING WIRE CO., Limited**

HAMILTON, Ont.

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## NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

**Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.**

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS.

CORRESPONDENCE SOLICITED.

Steel Works @  
Head Office:

**NEW GLASGOW, NOVA SCOTIA**

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**Engines, Air Compressors**

*Ask for Catalogue.*

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Consulting and Contracting Engineers

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## DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., \$400 to \$10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

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## Aluminum Powder

Manufactured By

THE

**CANADIAN BRONZE POWDER WORKS**

Montreal Office - - 324 Craig Street West

Works, Valleyfield, Quebec

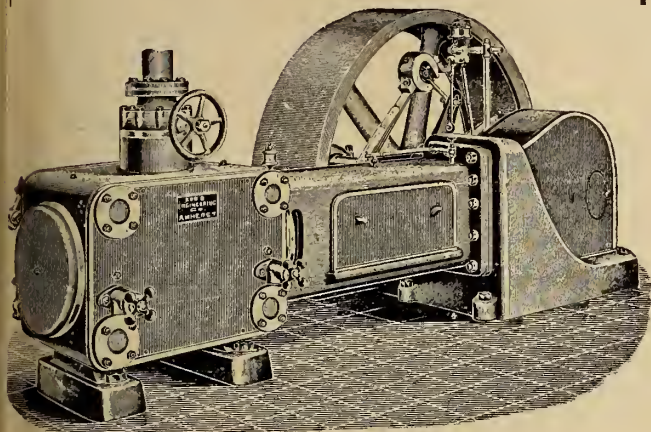
## MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

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### Engines

Corliss,  
Slide Valve,  
Horizontal,  
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### Boilers

Return Tubular,  
Water Tube,  
Internally Fired,  
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**Robb Engineering Co., Ltd., Amherst, N.S.**

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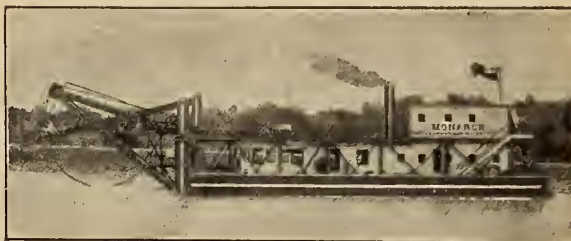
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| Traders Bank Building, Toronto, | - | - | Wm. McKay, "         |
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## M. Beatty & Sons

Limited

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MANUFACTURERS OF



**Dredges, Ditchers, Derricks,**

Steam Shovels, Steel Dump and Deck Scows,  
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Steel Skips, Clam-Buckets,  
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# DOMINION BRIDGE CO., LTD., MONTREAL, P.Q. BRIDGES

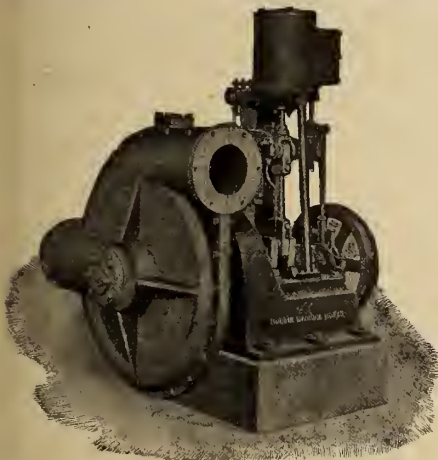
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STEEL BUILDINGS

ELECTRIC and HAND POWER CRANES

Structural METAL WORK of all kinds

**BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK**



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Centrifugal Pumping Machinery for various Industrial Purposes

We are building a special solid steel lined pump for handling tailings or slimes in gold mining. Estimates furnished upon application for pumping outfits for special purposes. Write for catalogue.

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# Flory Hoisting Engines

## STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

The **FLORY CABLEWAY SYSTEM** is Superior to any on the Market

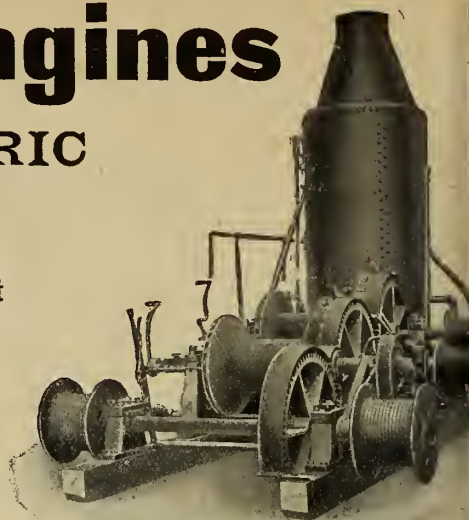
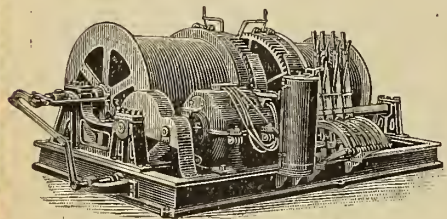
**Slate Mining and  
Working Machinery**

**SALES AGENTS:**

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**THE WETHERILL MAGNETIC SEPARATING PROCESS**  
MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to  
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GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.  
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## ENGINES, BOILERS,

All types and sizes. Complete outfits. Write for catalog

**E. Leonard & Sons,**

1790 St. James St.  
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Experienced Travellers  
—prefer the—

## Canadian Pacific Railway

for its excellent equipment. All are pleased with the bright, modern coaches; the exceptionally roomy berths in the sleeping cars; superior dining car service, etc.

The "good cars" bring the C. P.R. hundreds of passengers every week.

All equipment is built in the Angus Shops at Montreal from the most modern designs, embodying every improvement known to practical railroading.

**R. L. THOMPSON, District Passenger Agent, - - Toronto**



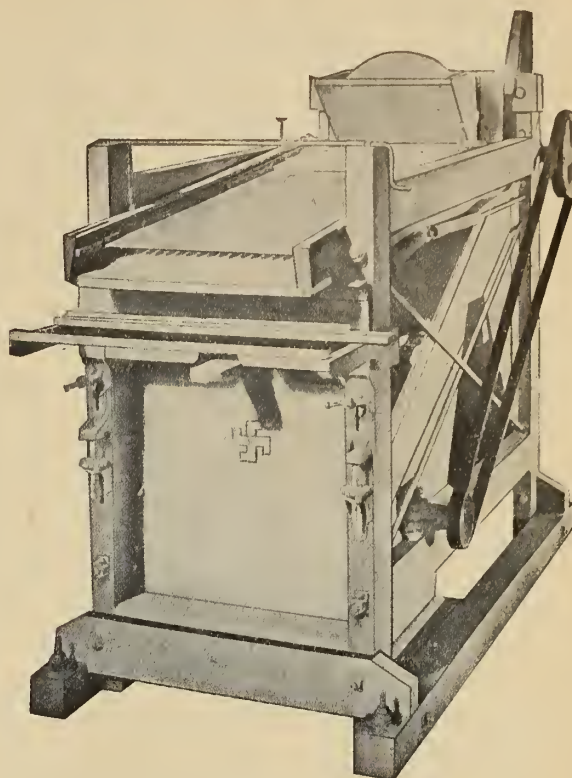
# Behrend Concentration System

## Combination WET and DRY

A complete recovery from all slimes and minerals such as Graphite, Galena, Stibnite, Chalcopyrite, Tetrahedrite, Sylvanite, Molybdenite, Stephanite, Argentite, Ruby Silver and and Native Silver.

This system will make low grade deposits pay. Every mine having an eye to business should investigate this system which has the approval of leading mining authorities.

A completely equipped plant, including concentrators, crushers, rolls, etc., for testing purposes is located at address below. Forward a sample of your ore for preliminary test.



## Behrend Concentrators, Limited

48 Inspector Street, Montreal



## Underwood

In buying a typewriter, it is well to know something of the mechanical facilities of the firm handling the machine.

We have a staff of twenty-seven expert typewriter mechanics, who repair and re-build typewriters of different makes.

It may be noted that only two of them repair Underwoods. The Underwood has but a speaking acquaintance with repairmen.

## United Typewriter Co., Ltd.

Adelaide Street East  
Toronto

and all other Canadian cities.

NEW YORK      PARIS      LONDON

**JACQUES BASZANGER & CO.,**  
108 Fulton St.,      New York City.

Importers of

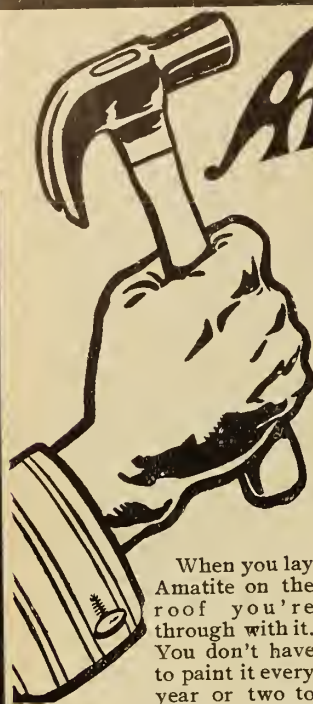
## Carbons

(Black Diamonds) for Diamond Drills



[Largest carbon ever found.  $\frac{1}{4}$  actual size.]

NOTE. We personally break (in this country) our carbons, thereby enabling us to determine accurately their quality. We deal only in very best quality and are always ready to ship goods on approval and for selection to responsible parties. Write us.



## Amatite ROOFING

All you need  
is a  
- hammer -  
you'll never  
need a  
paint brush

lay it right over the old roofing. It will cost you less than the continued maintenance of the old roof.

The point to remember is that *you will never need a paint brush* if you buy Amatite roofing. All you need is a hammer, because we supply free nails and liquid cement to finish the job.

Send for free sample of Amatite and you will at once see why it never needs to be painted and why it is more durable and lasting than any other.

Write to-day to nearest office.

When you lay Amatite on the roof you're through with it. You don't have to paint it every year or two to keep it from leaking. It has a *real mineral* surface which does not need painting.

Next time you are due to paint your old roofing, just let it go till the roof is worn out and then get Amatite and

THE PATERSON MANUFACTURING CO., Limited  
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## Elevating Conveying Power Transmission and General Machinery

Shafting  
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Safety Collars  
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Clutches  
Steel Split Pulleys

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and Bolts

Our Motto—Prompt Shipment, Fair Prices

## The A. M. Ellicott Co

301 St. James St.

MONTREAL

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## DRUMMOND, McCALL & CO.

MONTREAL TORONTO LONDONDERRY, N.S.

### Wrought Iron and Steel Pipes

All Sizes and to any Pressure

Iron and Steel Boiler Tubes

Red, White and Blue Brand Mining Steel

Full stock always on hand.

### Cold Drawn Seamless Steel Boiler Tubing

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For Stationary, Marine and Locomotive Boilers

Pressed Steel Floor Plates

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Tarred, Airproof, also Fireproof. Quality Guaranteed. All Sizes for Direct Import.  
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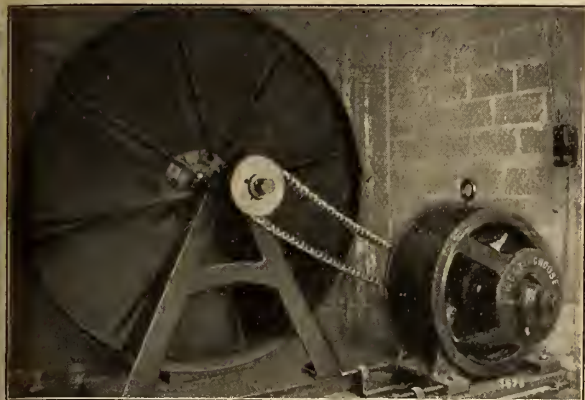


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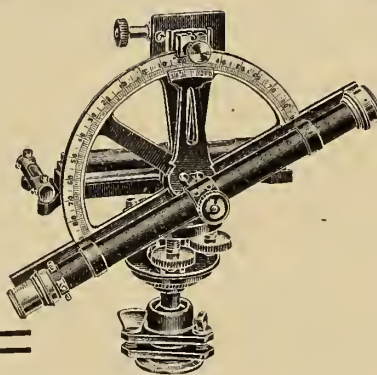
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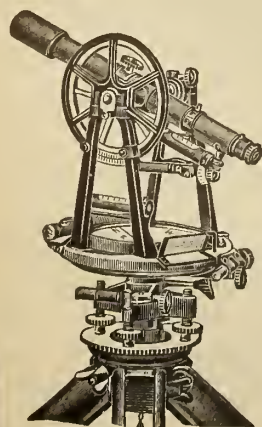
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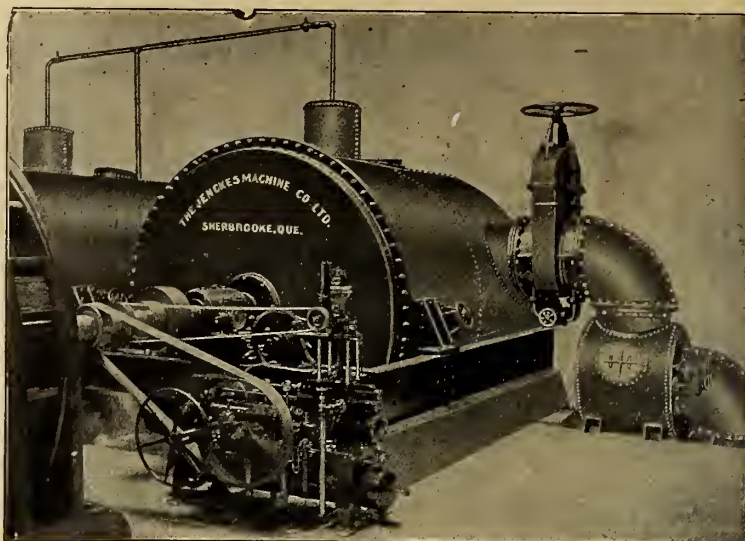
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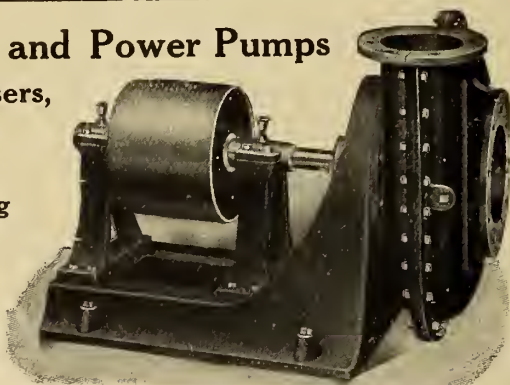
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, October 1, 1909

No. 19

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

**MINES PUBLISHING CO., LIMITED**

Head Office - - - Confederation Life Building, Toronto.

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J. C. MURRAY, B.A., B.Sc.

**SUBSCRIPTIONS**—Payable in advance, \$2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, \$3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

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### "THE MINING MAGAZINE."

We have looked with considerable eagerness for the first number of Mr. T. A. Rickard's new monthly. The high standard set by our contemporary, *Mining and Scientific Press*, led us to expect even better things from *The Mining Magazine*. And we have not been disappointed.

For the benefit of those of our readers who have not yet seen a copy of *The Mining Magazine*, we may explain that it is a new monthly mining periodical, published in London, England. Its object is to supply mining men, all over the English-speaking world, with a just monthly summary of mining news and technical progress, and a careful digest of current professional literature. Its publishers believe that a monthly publication will be best suited to this end. Specifically its aim is well summed up in the first editorial paragraph of the first number: "The purpose of this periodical is to be useful to those engaged in mining."

It is superfluous to say that *The Mining Magazine* will be honestly and capably conducted. Mr. Rickard's name is ample guarantee of this. But we shall expect more. If the initial number may be taken as a representative sample, and not a specimen, *The Mining Magazine* is assured of success. Its editorials are clear, outspoken and interesting—and of these three virtues the last is the rarest. The arrangement is effective. A general review of mining precedes the editorials. These are followed by special correspondence from the larger mining centres. Then come the markets, discussion, contributed articles, and the regular departments, of which that entitled "Précis of Technology" seems eminently instructive.

With the exception of one anonymous article on "Investments and Speculations," the entire 82 pages of reading matter in the first number of our youngest contemporary are alike readable and useful. This anonymous article includes a tabular classification of mining shares according to their present value as investments. *The Mining Magazine* treads on dangerous ground in giving this class of article. Although published in all good faith, material such as this is extremely open to misuse. We agree heartily with the editorial dictum of *The Mining Magazine* itself, that it is best to leave stock market tipping to the financial periodicals. But in justice to *The Mining Magazine* we must assure our readers that our contemporary's avowed policy emphasizes this point as strongly as does our own.

In welcoming *The Mining Magazine* we are not fulsome when we say that it is bright, clean, thoroughly reliable, and, from a technical point of view, more than

excellent. We commend it strongly to Canadian mining men.

### A CUSTOM SAMPLER FOR COBALT.

Some time ago a mild request was put before the Ontario Government. Facts, figures, and opinions were presented shewing, or tending to shew, that beneficent results would accrue to the Cobalt region if a public sampling plant were erected in Cobalt. We believe that the proposal was given not unfavourable consideration. However, although an appropriation was actually made, the scheme withered and died.

Possibly this was well. Nothing beyond a rather indecorous auction sale has come of the Ontario Government's attempt to operate the Provincial mine on the Gillies Limit. The Department of Mines has been, and is, undermanned. One devoted official inspects all the mines of the Province, and, during the life of the late lamented Provincial mine, the same official acted also as mine manager. Hence we have misgivings as to the manner in which a public sampler might have been operated.

It has always appeared to us that a modern sampling plant is a *sine qua non* in any large metal-mining camp. Cobalt needs one, not only because of the variable and complex character of its ores, but also because of the camp's relation to the smelters and to the market generally. Study of the situation compels us to conclude that an independent sampling plant, well-situated to receive and discharge shipments of ore, will surely promote peace between the ore-producer and the ore-buyer, and will, in the long run, influence favourably the prices paid.

It has remained for two enterprising young Canadians to carry out the project of designing and erecting a custom sampler in Cobalt. Messrs. Campbell and Deyell, who have practised for some years in Cobalt as surveyors, assayers, and mining engineers, have elaborated plans and specifications for a suitable sampler, and have also, we understand, succeeded in interesting sufficient Canadian capital to warrant the immediate construction of the plant.

On another page we publish full particulars of the projected sampler. It suffices here to signify our warm approval of the new enterprise.

### THE PETERSON LAKE SQUABBLE.

From the Cobalt Peterson Lake—Nova Scotia controversy there is at least one lesson to be learned. An acrimonious dispute arose over the alleged carelessness of the Nova Scotia Silver Cobalt Mining Company in working ground leased from the Peterson Lake Silver Cobalt Mining Company. Into the particulars of the case it is hardly profitable to go. But it is evident that through lack of skilled supervision the Peterson Lake

Company has been placed in an awkward position. So also has the offending Nova Scotia Company. If the mining operations of both companies had been under the absolute control, not of absentee directors, but of competent mining engineers, the dispute never would have arisen.

Engineers were engaged by the Peterson Lake Company at the eleventh hour. Mr. Segsworth's report, which we have had the pleasure of reading, is definitive, careful, and businesslike. It stands out in strong relief when compared with many of the slim documents, labelled reports, that have emanated from Cobalt. Associated with Mr. Segsworth was Mr. J. W. Astley, formerly of Le Roi mine. The report reflects credit upon both gentlemen, and, as is always the case when competent engineers are concerned, it deals logically with hard facts, presenting them in such a way as to be thoroughly intelligible to the layman.

There are several mines and many prospects in and about Cobalt that require diagnosis and treatment by a real mining engineer. The *bona fide* mining engineer is always called upon in time of trouble. But it is better business to get him as a preventive rather than as a cure.

### THE DUNCAN RIVER COUNTRY, B.C.

A mining region of great progress is the Duncan River country, north of Kaslo, B.C. The lead-silver ores of this district are well worth exploiting. Authentic analyses show that some of the ore bodies carry high percentages of lead and respectable quantities of silver. Assays carrying from 50 to 100 ounces of silver, along with from 50 to 65 per cent. of lead are not uncommon.

The absence of roads has deterred the development of the Duncan River district. It is expected now that the Provincial Government will commence the construction of wagon roads at an early date. Indeed a good road is even now under construction. This leads up Hall Creek and will form one link in the necessary chain.

The Government of British Columbia will be amply repaid in the future for any expenditure of this kind undertaken now.

### POLAR POLEMICS.

When the jaded citizen turns to his evening news paper for refreshment, ten to one his eye falls upon columns of Cook and pages of Peary. Already we are sufficiently familiar with the domestic virtues of both gentlemen. We know how each of them looks in deer skins, and in conventional garb. We know Peary's opinion of Cook, and Cook's opinion of Peary, and we have formed our own opinion of both. And our own opinion will require censoring if this kind of thing is continued.

In Montreal are several clever gentlemen who make a specialty of merging and combining industries that are



in a delicate condition. Would it not be practicable for these same gentlemen to amalgamate Peary, Cook, and our own brawny Bernier? "Amalgamated Polar Publicists" has a goodly sound.

With Mr. Roosevelt making strange noises from out Central Africa, Lieutenant Shackleton orating about the Antarctic, and Cook and Peary at garrulous war, our intellect is in danger of total eclipse.

### THE STAMP-MILL.

The development of the heavy stamp is one of the outstanding features of ore-dressing practice during the last twenty years. Two decades ago, the 900-lb. stamp was the heaviest in use in America. It is true that, even at that date, heavier stamps (1250-lb.) were in use at a few mines on the Rand. But these did not set the fashion, and little was known then of their performance.

Exhaustive experimental work on the Rand, work in which Mr. W. A. Caldecott was a leading spirit, demonstrated clearly the higher commercial efficiency of heavy stamps. Roughly, a weight of at least 1750 lbs was indicated as desirable, and, of late, stamps heavier even than this have been installed. Incidentally, experience has shown that the cumbrous cast-iron anvil block is a superfluity. Heavy concrete foundations, with merely a thin layer of insertion between the concrete and the mortar-box have given entire satisfaction, notwithstanding the increased weight of the stamps.

In Mr. Caldecott's paper, "The Development of Heavy Gravitation Stamps," reproduced in this issue, these and other points are elucidated. Mr. Caldecott's papers are the ripe fruit of experience. We commend this paper to our readers.

### THE COPPER RESOURCES OF VANCOUVER ISLAND.

What the future has in store for Vancouver Island as a copper producer is foreshadowed in a letter written by Mr. W. H. Trewartha-James, general manager of the Tyee Copper Company, and published in the *Victoria Daily Colonist*.

Mr. Trewartha-James estimates that Vancouver Island has produced, during the past five years, about one-half the copper that has come from the entire Pacific Coast district.

During the twelve months ending August 31st, 1909, the Tyee Copper Company's smelter at Ladysmith turned out 3,500,000 pounds of copper, 52,000 ounces of silver, and 7,000 ounces of gold. This includes about 208,000 pounds of copper produced during six months from a group of mines on Vancouver Island.

But it is evident that Vancouver Island has hardly begun to get its stride. The Island is, to a large extent,

*terra incognita*. We believe that the opening up of its mineral deposits will be a vital factor in the industrial progress of British Columbia. Interest can best be aroused by public pronouncements of responsible men like Mr. Trewartha-James.

### EXPLANATORY.

Commenting upon an editorial that appeared in our issue of September 15th, the *Evening Citizen*, of Ottawa, while admitting that the *Canadian Mining Journal's* strictures upon certain daily papers are to a considerable extent justified, claims that there is great difficulty in securing reliable mining news, and that daily papers cannot afford to maintain correspondents in mining camps.

The contention of our respected contemporary is, no doubt, quite true. But it hardly covers the point under discussion. We contend that our daily journals should least of all afford to accept and publish the extravagant misstatements of promoters and brokers. How far each paper can go in the direction of getting authentic news is a function of each paper's enterprise.

The *Evening Citizen*, to give further force to its argument, takes exception to our Special Correspondence columns. It charges us with carelessness and inaccuracy. Notices regarding mining properties, states the *Citizen*, in the Elk Lake district or Gow Ganda, or Miller Lake, are published in the *Canadian Mining Journal* under the head of "Cobalt news." This the *Citizen* takes as evidence that we are "getting the four camps mixed up."

As the charge is apparently made without levity, we must hasten to assure our contemporary that we are not ignorant of the geography of Northern Ontario. In fact much of that same geography has been learned to the pestiferous accompaniment of black flies and mosquitoes.

The explanation, if explanation be needed, is simply that most of our correspondence, gathered from many sources, is actually written in Cobalt. Cobalt is still the hub of the northern silver district and the gathering and distributing centre for mining news. Quite seriously, it had never occurred to us that the arrangement of our Cobalt news letters could lead to confusion. We had taken it for granted that the great bulk of our readers had some idea of the relative positions of the old and new mining camps of the north. We hope that the *Citizen* will clear its editorial mind of the horrible suspicion that we don't know Cobalt from Gow Ganda.

### AN OMISSION.

In our issue of September 15th, there appeared a reproduction of the flow-sheet of the Goldfield Consolidated mill. Mention was made of the fact that the Allis-Chalmers Company furnished the machinery for this plant. To this should have been added the statement that the Deister Concentrator Company installed 70 of their No. 3 tables.



# THE PROJECTED CUSTOM SAMPLING PLANT—TO BE ERECTED THIS YEAR IN COBALT, ONT.

Written for the Canadian Mining Journal.

The question of a sampling plant in the Cobalt camp has long been mooted, and it is only within the last few days that final arrangements were concluded enabling Messrs. Campbell and Deyell to proceed with their plans and erect the works, the general scheme of which was laid before the mines, smelters, and government some months ago. Negotiations are in progress with the La Rose Company whereby the Sampling Company proposes to lease a site from the former. Should this arrange-



SITE SELECTED FOR C. & D. SAMPLER—LOOKING SOUTH.

ment be carried through satisfactorily, the first sod will be turned in the next week. The site as shown in the accompanying plate is the strategic position for such a works.

The province of the Sampling Company will be to sample and assay all the products from the mines, thereby establishing the percentages of the constituent values, such certified estimation to be the basis of settlement between mines and smelters. The company proposes to take ore from the mines in large or small quantities, weigh, sample, assay, giving their certificate to both mine and buyer. Storage capacity will be provided for ore that is not immediately sold and for purposes of holding ore until the proper material has been added to bring it up to smelter requirements. When shipped, the ore will be placed in non-leakable bags and consigned under seal. The bullion resulting from the melted metallics in the ore will be shipped to smelter or refinery according to understanding between buyer and seller of ore. Certificates will be given in respect to silver, stating weights and amount of silver in friable ore; also weight and number of ounces in bullion, with allowances for slag, dust, loss, moisture, etc. The analyses for cobalt, nickel, arsenic, silica, lime, iron, etc., will be given in percentages.

A few of the functions of such a concern are:—

1. To have a neutral party value the product between buyer and seller.
2. To permit the producer to realize quickly on his raw product, and thus place him in a stronger financial position even should he not find an immediate market.
3. The grading of the various ores to enable the producer to meet the variations of the different markets.

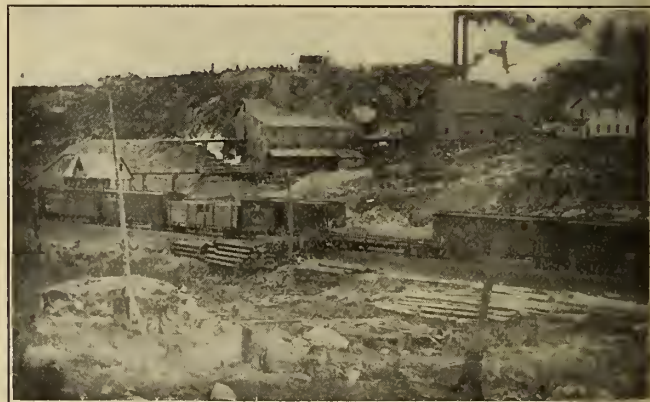
4. To enable the buyer to procure a product most suited to his metallurgical requirements, thus eliminating the chance of getting undesirable products on his hands. The great complexity of the Cobalt ores renders it difficult to more than guess at the percentage of constituents before sampling. The works will thus place the mine and smelter on a sane business footing.

5. Being the only plant in Eastern Canada of its kind, its sphere of influence will be large, and it will tend to centralize the mining industry, which at present has no recognized centre.

6. The direct benefit to the town of Cobalt and to the T. & N. O. Railway derived from the establishing of a valuing point at Cobalt need only be suggested to be appreciated.

In answer to the objection that such a works should have been erected at the inception of the mining in Cobalt, and that the camp is now at its zenith and in consequence is too late to erect a plant, it may be said that such objection is not valid. The camp is not yet at its zenith, as later we will prove, and also, conditions of market and knowledge of the ore would not have permitted the successful operation of a sampling works, if erected previous to the present year.

In the early history of the camp the heads of the most prominent sampling concerns across the line came and pronounced a sampling works not feasible. Since then the smelters have evolved mechanical methods, and the ore sampling concerns across the border have instituted a system of quadruple checking by hand sampling. The great difficulty met with is in the presence of the metallics and the non-uniformity in composition of the ore. The method evolved by Messrs. Campbell and Deyell and to be used by the company is that of fine

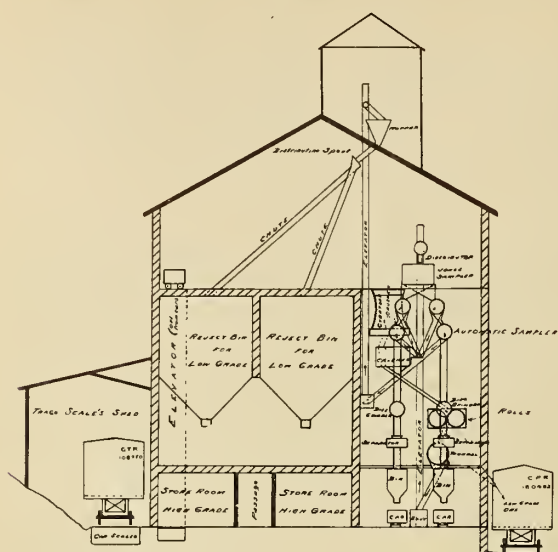


SITE SELECTED FOR C. & D. SAMPLER—LOOKING EAST.  
La Rose and O'Brien Mines in background.

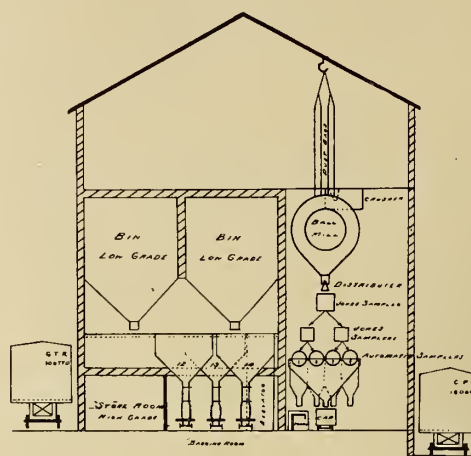
grinding in a Ball mill of all the ore, the pulverized portions being screened off and thoroughly mixed, split into four equal parts by automatic riffle samplers, each of the resultant quarters being separately sampled down to the requisite laboratory sample. All this process is automatic, and permits of four separate samples of each shipment of ore. The metallics are extracted from the







SECTION  
THROUGH  
LOW GRADE PLANT



SECTION  
THROUGH  
HIGH GRADE PLANT

screens of the mill and melted into bar bullion and sampled by a special method. The low-grade ore is treated by a modification of the above-mentioned principle. The personal equation has been eliminated from the processes to the greatest possible extent, all important operations being entirely automatic.

The question now arises as to the permanency of the camp, and is largely answered by its past and present performance, by its present ore reserves, by the general confidence of those in close association with the mining there and by the industrial enterprise based on a prolonged life of the camp. In the latter respect the following may be mentioned:—

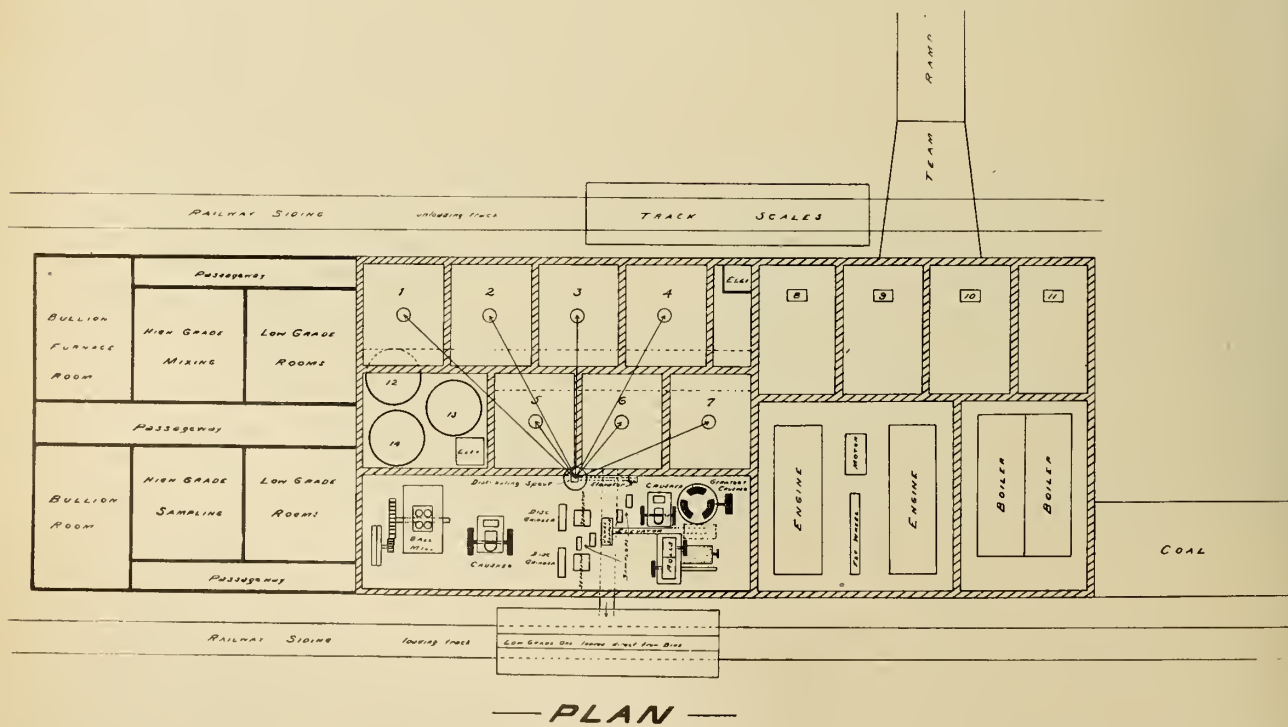
1. Power companies. There are three of these concerns, who estimate their initial expenditure at about \$3,000,000.00.

2. The proposed double tracking and installation of electric traction on the T. & N. O. between Cobalt and Haileybury, also the erection of the new station at Cobalt.

3. Municipal improvements; sewage and waterworks, and erection of more substantial buildings in Cobalt.

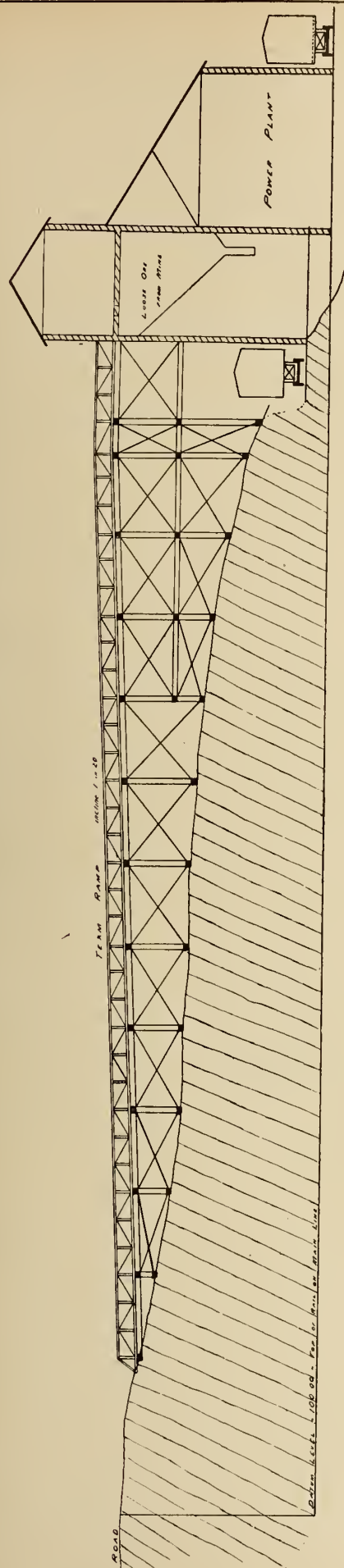
4. Electric railway between Cobalt and Haileybury.

5. Concentrators. There are now eight concentrators in operation in the camp—five under construction and one projected. The present capacity is 635 tons per day.



NOTE—Bins N° 1 to 7 are for Low Grade Ore (Reject) Directly under these are Stock Rooms for High Grade Ore in bags. Hoppers N° 12, 13, 14 are for High Grade Rejects which are to be bagged. Bins 8, 9, 10, 11 are for Low Grade Ore from the mill.



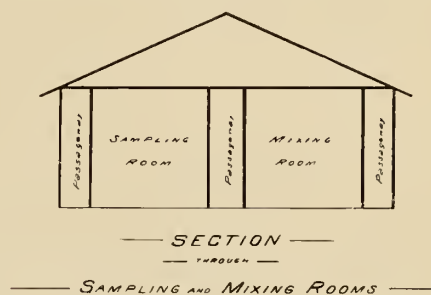


This will be increased to 1,000 tons when the other mills are completed. It is estimated that the aggregate cost will total \$1,000,000.

The production of the camp has been as follows:—

|                        | Tons.            | Value.             |
|------------------------|------------------|--------------------|
| 1904.....              | 191.55           | \$136,277          |
| 1905.....              | 2,336.01         | 1,485,530          |
| 1906.....              | 5,836.59         | 3,573,908          |
| 1907.....              | 14,851.34        | 6,476,555          |
| 1908.....              | 25,510.91        | 9,000,000          |
| 1909, to June 30, '09. | 15,000.00 (est.) | 5,290,000          |
|                        |                  | <hr/> \$25,962,270 |

The shipments to August, 1908, were 14,564 tons; to August, 1909, 20,300 tons; which shows an increase of 40 per cent. in tonnage for this year, which, if it holds, will make about 35,700 tons for 1909. The tendency, owing to the operations of the numerous concentrators, is towards a one-value product. This will decrease the tonnage proportionately and concentrate the values, while the more comprehensive mining policy now in vogue will tend towards a uniform lower grade product of greater tonnage, instead of robbing the reserves for false dividends and having to balance up later on on dump material. It is estimated the average value of the product shipped this year is the same as that of last. The above factors will tend to maintain and even



increase the tonnage, according to development, while shipping the same grade product.

A contradiction to the statement that Cobalt has not been a good investment and has only enriched those who have traded on its spectacular showings, is found as follows:—

Approximately, the O'Brien and Drummond, the privately owned mines, have netted their owners \$2,100,000.

Including the non-dividend payers, Nancy Helen, Chambers-Ferland, King Edward, Nova Scotia, Peterson Lake, Foster and Green-Meehan, and also the fourteen dividend payers, we see that these 21 companies have a total issued capital of \$49,895,568; total dividends to June 26, 1909, \$11,916,510; dividends paid in 1909 to June 26, 1909, \$4,016,970. Figuring from the summer of 1905, when most of the companies were incorporated, these mines as a whole have paid 6 per cent. on the money invested. The rate of interest for this year, taken from the above figures is about 16 1-10 per cent.

The figures given do not include royalties.

The total value of ore to June 30, 1909 (est.), \$26,000,000.

|                          |              |
|--------------------------|--------------|
| Total dividends .....    | \$14,062,510 |
| Total royalties .....    | 934,122      |
| Cost of production ..... | 11,000,368   |

on a basis of 50c an ounce for silver (waiving the copper, nickel and arsenic values), the cost of production including marketing would be 21c per oz.

It should be remembered that silver was produced very cheaply in the first two years of the camp during the gathering stage.

For the year 1908 some costs were as follows:—

| Mines.                | Gross Value. | Charges.  | Cost of Production (include marketing). |
|-----------------------|--------------|-----------|-----------------------------------------|
| La Rose Consol. . . . | \$819,823    | \$281,420 | 17c oz.                                 |
| Kerr Lake . . . . .   | 789,312      | 247,359   | 15 6-10c oz.                            |
| Nipissing . . . . .   | 933,544      | 339,078   | 18 1-2c oz.                             |
| Crown Reserve . . .   | 910,350      | 159,984   | 9 3-10c oz.                             |

These show that notwithstanding the increased difficulty in extracting the ore, these companies are still able to mine within the average.

With regard to the surrounding camps, little can be said other than that legitimate mining has just commenced, and there is some good positive evidence in favour of some of the ore bodies. They can but enhance the silver output.

The accompanying prints show diagrammatically the layout and process of the proposed works. They do not purport to be complete, except in principle.

As a corollary, it may be said that the capitalists interested in this Sampling Company are all residents of Toronto, and are not in any way connected with mines or smelters. Messrs. Campbell and Devell hold control of the stock in order to ensure the present and future neutrality of the company.

### DISCOVERY.

There has been a lot of discussion in Northern Ontario concerning the advisability of requiring an affidavit of discovery of "valuable mineral in place" at the time of recording a claim. The wording is explicit and requires of the prospector a condition that in other provinces is only required or is expected after an opportunity to thoroughly explore the claim.

For instance, in Quebec, under the new Mining Act, any holder of a prospecting certificate may stake out a claim on finding "mineral" or an "interesting indication." Then he has four months to prospect his claim before recording or making any payment whatever. Then the discovery of mineral and a rental per acre is required. If nothing is found the claim may be abandoned.

Again, in British Columbia a "valuable deposit of mineral" is required. This is defined as "mineral in place, in appreciable quantity, having a present or prospective value sufficient to justify exploration." The last phrase allows the prospector an opportunity to open up a favourable indication without leaving himself open to a charge of perjury, which is the only result of the hard and fast Ontario law.

Having in mind the area being prospected for silver in New Ontario, the most conscientious prospector would not hesitate to stake on a showing of cobalt bloom, yet it could hardly be called a "valuable mineral in place;" it is only a favourable indication. The only possible thing is to find native silver or its ores, which is absurd to expect in every case. So the prospector, knowing the impossibility of living up to the exact letter of the law, allows himself a loose interpretation of it that practically nullifies the discovery requirement. For instance, having found a flake of iron pyrites in diabase, he will stake a claim. He argues that iron pyrites is a valuable min-

eral and is assuredly "in place," so for the chance to prospect he will commit perjury, morally and perhaps legally, depending on the interpretation of the law.

All the prospector wants is a chance to prospect. Due to staking booms, this is almost impossible in New Ontario. The man who conscientiously tries to prospect finds it staked from under him and tied up for an indefinite period. His only recourse is to stake first and prospect after, which introduces the harsh word perjury. A big factor in these rushes is the fact that a staker may stake three claims each on behalf of as many of his acquaintances as take out licenses. This has introduced many evils, including "blanketing." In one case a gang of men staked out ninety claims "en bloc," in the depth of winter, with four feet of snow on the ground. Many other groups of from twenty to fifty claims were staked out at the same time. Operations like this force the prospector out in winter, when it is ridiculous to think that a bona-fide discovery could be made on even one per cent. of the claims recorded.

The discussion aroused by these conditions would indicate that some change will have to be made soon, to give the prospector a chance. The remedy can only be arrived at by discussion and consideration of amendments in the law as it stands at present.

Some have proposed that the locator only be allowed to stake for himself. This would greatly lessen the evils of the "rushes" and would force the locator to be more careful in his prospecting. Company interests may object, but the hardship to them would not be very serious.

A relaxation of the stringent requirements as regards discovery would create a greater regard for the law, but under the present act would not be of much benefit. If coupled with a provision, such as is in the Quebec law, allowing some time to prospect after staking, but before recording it would undoubtedly relieve the situation.

But while one man may stake out any number of claims, rushes, winter staking and perjury in regard to the discovery of "valuable mineral in place" will flourish.

It is to be hoped that mining men who are interested in the opening up of the undeveloped mineral areas of Ontario will take part in a discussion; that can do no harm, and will, no doubt, be of much benefit in bringing before the authorities suggestions for the improvement of the admittedly imperfect Ontario Mines Act.

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A suggestion was made some time ago in South Africa that coloured wrappers be used for explosives, so that detection of unused fragments in sumps and working faces would be easier. This has been improved upon now by the proposal that the explosives themselves be coloured. If each kind of explosive used were given a different colour, accidents might be traced more readily. This might entail a small sacrifice of strength, but the compensation in added safety would no doubt be ample. Of course, both wrapper and explosive should be coloured. Unsulphonated red azo-dye, being soluble in nitro-glycerine, would be suitable for colouring the explosive.



# SOME NOTES ON THE HISTORY AND RECENT DEVELOPMENT OF THE CANADIAN MINING INSTITUTE.

Paper read before the Cobalt Branch of the C.M.I. by Secretary H. Mortimer-Lamb.

Although the Canadian Mining Institute is still relatively a young organization, it may be safely assumed that a very considerable proportion of its present membership is uninformed concerning the early history of the society or the causes that led to and resulted in its organization, nor have a number knowledge of its traditions, and the useful services it has rendered the mining industry since its inception. This ignorance, if it may be so termed, is readily understood when it is considered that mining engineering, unlike most other professions, is a sort of will-o'-the-wisp to those who follow it. It is rare for a man belonging to this profession to remain for any length of time in any one place or country. If he succeeds in establishing a reputation in a particular locality, there immediately arises a demand for his services, with the proffer of greater inducements elsewhere. If, on the other hand, his management of a mine in one camp is inefficient, he necessarily drifts on with the stream. Thus, of the original membership of the Institute few now remain on the list, the ranks having been recruited year by year, and especially during the past two years, by new men—men either of a younger generation, fresh from the mining schools, or by engineers or mine managers or superintendents representing outside capital, recently attracted to Canada. Nothing, in fact, indicates more forcibly the cosmopolitanism of mining than the character of the membership of the Canadian Mining Institute, which is in itself an essentially Canadian institution, yet includes amongst its members a very large number of men owning other nationality—the United States, Germany, France, Sweden and Italy.

To begin at the beginning, the Canadian Mining Institute as constituted to-day was not of spontaneous generation. Its inception and development followed along evolutionary lines. In the year 1890 a very pernicious and unjust measure was passed by the Quebec Legislature, imposing a royalty of 3 per cent. of the gross value of the product upon mines already alienated from the Crown by actual sale, without any reservation of the right to levy such royalty. The Act also contained other provisions similarly retroactive in effect and unfair in character. It was realized that if this Act were allowed to become operative, it would not only be a heavy blow to established industries, but would also seriously check new enterprises. At this time the only periodical devoted exclusively to Canadian mining interests was the "Review," published at Ottawa, and edited by Mr. B. T. A. Bell, a young Scotsman possessed of extraordinary energy and a forceful personality. At his initiative a meeting of the mine operators of the Province of Quebec was convened and held in the Windsor Hotel, Montreal, on January 23rd, 1891, primarily to combine to oppose this measure, but during the evening a resolution was formally adopted whereby the Quebec General Mining Association came into existence.

Following this example, a year later, March, 1892, the organization of the Mining Society of Nova Scotia was effected as the result of a circular issued by Messrs. J. E. Hardman, R. G. Leckie, Chas. Fergie and others

to the mining men of the province, in which their co-operation and interest were invited in the formation of a United Miners' Association, the object of which was to promote generally the welfare of the mining industries. The society immediately justified its existence by its success in inducing the Provincial Government to modify, and in some instances to amend entirely, certain ill-advised clauses in the province's enactments relating to mines and mining leases, which were shown to be inimicable to industrial interests.

Ontario was the last of the three Eastern Canadian mining provinces to organize; but here again, thanks to Mr. Bell's exertions, this was accomplished in April, 1894, when a meeting was held for the purpose at the Rossin House, Toronto. Of those among the first to sign the roll of membership it is interesting to note the names of Prof. W. G. Miller, who for the past two years has so worthily filled the office of president of this Institute; Mr. R. W. Leonard, Mr. T. W. Gibson, Dr. Goodwin, Dr. Nichol, Dr. Coleman, Mr. J. M. Clark, Mr. J. T. Laidlaw, and others well known to us here. The existence of the Ontario organization as an independent body was, however, brief. The society, in fact, was never incorporated, since when this was proposed the question of the federation of the three associations had already been mooted, and the men of Ontario fell readily in with the project. But while the desirability of the step was generally agreed upon at a united meeting of the three societies at Cape Breton in July, 1894, federation was not finally consummated until January 10, 1896.

The birthplace of the federated Canadian Mining Institute was Montreal. Its first president was Major R. G. Leckie. The scheme, which had as its main objects economy in publication, consideration of matters affecting or relating to the mining industries of the Dominion within the jurisdiction of the organization, and the holding of a united meeting annually, aiming in no way to interfere with the autonomy of the respective societies, proved only moderately effective; and when in 1898 some accessions in membership were obtained from British Columbia, it was decided to reorganize on somewhat broader lines by the creation of a society under one central administration, which should be essentially national in its aims, character and scope. Thus, at the close of the annual session of 1898, the Federated Canadian Mining Institute was dissolved, and the Canadian Mining Institute incorporated by Act of Parliament, founded in its stead. The Institute's first president was Mr. John E. Hardman, while Mr. Bell continued to act as secretary until the time of his death in 1904. When originally organized, the membership of the Institute was but sixty-three; but its success was assured from the start, and before the close of the year this number had increased to one hundred and ninety. To-day it is between eight and nine hundred.

The popularity of the Institute and its growth during the past eleven years may, perhaps, be attributed to two principal causes: the fortunate selection of public-spirited and able men to direct its affairs as members



of the governing body or Council; the tangible results achieved by the society in the interests of the mining industry. The first of these causes is naturally paramount in importance, for the Institute could not have influenced public opinion, secured recognition from governments, or otherwise played as it has a momentous part in the amelioration of conditions, had the men who administered its affairs and policies been anything else but zealous, able and disinterested. It is, meanwhile, a matter of record that one of the Institute's presidents, at the time resident in a distant part of the country, never once failed in his attendance at a Council meeting during his two years' term of office, although to perform this duty he was obliged on each occasion to undertake a special journey of over a thousand miles. To attend an annual meeting the president elected in 1907 travelled over six thousand miles, while last year the president of the Institute devoted no less than seven weeks of his time to duties, at times prodigiously strenuous, which fell to his lot as the Institute's chief executive officer and leader of the ocean-to-ocean excursion, representing over ten thousand miles of continuous travelling. These are merely instances. It may be added that there are very few men who have served on the Council to whom almost equally high tribute might not be justly paid; and to their devotedness, interest, loyalty and singleness of purpose the society is very deeply indebted.

As to the actual accomplishments of the Institute during the period under review, there have been, of course, advantages common to all successful societies of a like nature; such advantages, for example—social and educational—as are expected to be derived from professional intercourse, the interchange of views and ideas between men following the same calling, and by the publication and dissemination of valuable information and records. But probably no mining society in the world has exerted its ascendancy to an equal degree or to better purpose in safeguarding the interests of its members, or rather of the industries they represent, against the passage of oppressive or ill-advised legislation, or has done more to influence the introduction of remedial measures where these were necessitous. Merely to indicate the scope of the Institute's activities in these directions, allusion need but be made to one or two instances of its successful opposition to the passage or operation of ill-considered legislation, such, for example, as the Order-in-Council of the Ontario Government in 1899, recommending the imposition of an export duty on copper-nickel ores and mattes—the effect of which, had it been put in practice, would undoubtedly have been to paralyze the nickel industry in Canada; and the proposed "Act to amend the Mines Act" of Ontario, 1900, which, as originally framed, passing a first reading, imposed absolutely ruinous and prohibitive taxes on the mining industry of the province. Again, in more recent times the advice of the Institute has been repeatedly sought by both the Federal and Provincial Governments in respect of proposed mining legislation, while if the society had done nothing else, its claims to consideration would have been more than upheld by the successful result of its endeavours whereby a Federal Department of Mines has been established under the direct administration of a responsible Minister. The recent repeal of the Quebec Mining Law, and the enactment of a new set of regulations decidedly more conducive to the encouragement of legitimate prospecting and industry, is also directly traceable to the Institute's representations.

Other testimony might readily be adduced in evidence of the Institute's activity and services in the past,

but doubtless sufficient has now been mentioned to fully serve the present purpose.

It may now, meanwhile, be permissible to refer more specifically to the objects of the Institute, to the ideas of the promoters who formulated them, and to compare conditions existing when these ideas were adopted with conditions to-day, in the hope thereby of provoking discussion on some of the questions involved. Briefly, then, these objects as set out in the Institute's charter, comprise the promotion of the arts and sciences connected with the economical production of valuable minerals and metals; the distribution of information; the establishment of a central reference library and headquarters; concerted action upon matters affecting the mining and metallurgical industries of Canada, and lastly, the encouragement and promotion of these industries by all lawful and honourable means. These objects, it will be noted, cover a very wide field, and are very much more comprehensive, than the sole object, for example, of the Institution of Mining and Metallurgy, which, as a strictly technical society, confines its aims to the general advancement of mining and metallurgical science. The charter of the Canadian Mining Institute, moreover, differs from the constitution of the Institution of Mining and Metallurgy in that the former contains no clause relative to the qualifications required of persons seeking enrollment as members, the matter being regulated merely by by-law, which is subject to amendment at any annual meeting; whereas in the case of the latter these requirements are very explicitly defined, and are not amenable to change. The records of the Institute, however, show that its founders very carefully considered the issue of the desirability, or otherwise, of organization on strict lines of technical or professional qualifications; and the conclusions then arrived at that the time was not opportune to attempt to found a society composed exclusively of professional men, and that, furthermore, if all conditions were favourable to the promotion of such a project, greater ends might be served by organizing on broader lines, and thus launching an organization which would embrace within its scope of activities not only the promotion of the arts and sciences of mining, but that of the industry of mining also. Hence, this was the idea that found expression in the charter, and the by-law regulating the matter of the eligibility of candidates for enrolment gave the Council practically without limitation or restriction discretionary powers as to whom they might admit to membership. Every system, however, is liable to abuse, and there can be no doubt that during the first few years of the Institute's existence, in the natural desire to increase its membership, less care than might have been was exercised in scrutinizing the status of certain candidates, with the result that several were admitted whose admission reflected no credit on the organization. No change in this general policy was made until some three years ago, when, at the annual meeting in Toronto, a new by-law was adopted establishing a second class of membership, those elected to which being termed "associates." This new by-law, while not limiting the Council's discretionary powers, was at least a suggestion to that body to thereafter discriminate between technically and non-technically qualified persons applying for enrollment, by classifying the latter as associate members. As to the advantage of this change opinion is still somewhat divided, although generally it is believed favourable. At the same time, it is fair to add that at least one member of the Council has registered a protest against the present practice, on the grounds that in his opinion it is not in the interests of the Canadian



Mining Institute, nor of the mining industry, nor of the profession of mining engineering, to attempt to establish a class distinction in the Canadian Mining Institute under existing conditions. In other words, the opinion of this gentleman appears to be that since the Institute represents an industry and not a profession, membership classification or discrimination, such as may be practised by essentially technical societies, is not one of its legitimate or logical functions. On the other hand, it may be well argued that while this may not be in accord with established precedents, these in a new country may be ignored without fear of dangerous consequences; and that, therefore, the Institute need not be deterred from adopting a policy of its own that would differentiate it from any other society of similar aims, for the reason merely that it would appear to be a departure. Admitting this, it but remains to discuss the question of the policy of classification on its merits. The most important point of all is how it has affected and how it is likely to affect the general development and usefulness of the society. So far as the by-law's recent operation is concerned, it is difficult to prove that it has exerted any injurious effect. This by-law has now been in force for nearly three years. In that time the membership has very nearly doubled. In 1907 there were elected 161 members and 34 associate members; in 1908, 87 members and 62 associate members, and in 1909 to date, 49 members and 52 associate members. During these three years only three candidates for membership have objected to their classification as associates, and in but one case has a candidate withdrawn his application in consequence of a ruling. This gentleman was a director of mining companies, his actual knowledge of mining was merely perfunctory, and in no sense professional or even practical. The Council, acting in accordance with the implication of the by-law, could not, therefore, have well come to any other decision than they did in adjudicating on this application.

It will be noted that the distinction between a member and an associate member is little more than nominal, the associate having all the privileges of membership, with the exception only that he is debarred from holding office. The attempt to classify the membership may be said, then, to have a sentimental basis rather than anything else, although its ultimate aim may be eminently practical. Thus, even full membership in the Canadian Mining Institute does not at the present time imply professional proficiency or even professional experience. A graduate fresh from college is as eligible for full membership as is a mining engineer old of international repute. The Institute merely draws a line, and a not particularly distinctive line, between those professionally engaged and those commercially engaged in the mining industry. Nevertheless, even this somewhat meaningless discrimination has, in the writer's belief, served to popularize the Institute with the class of men whose interest and support is of most value to the society. Although, as has been stated, the Institute represents an industry and not a profession, it can scarcely be disputed that the esteem in which the organization is held and the influence it exerts, is mainly attributable to the fact that its membership is preponderantly professional in character. Again, the technically trained engineer or practical mining man is necessarily in a position to render greater service to a society, one of whose chief objects is the publication of technical information, than another whose qualifications to express himself authoritatively on this subject are entirely limited. To complete the argument in favour of membership classifications, it may be further

urged that no person desiring to join the Institute for legitimate reasons, such as to secure its publications, attend its meetings, or participate in its work, could or would offer reasonable objection to being classified as a non-technical man if he had no claim to the title of mining engineer. On the other hand, it is conceivable that one proposing to make improper use of his membership by, as has been done in the past, advertising it as proof of expert qualification, would strongly disapprove of a discrimination which might easily interfere with his schemes in this regard.

Against the system of discrimination the strongest argument, perhaps, is that it is not sufficiently thorough, and is, therefore, non-effective, if not actually injurious. Non-effective in the sense that the qualifications required for admission to membership are so broad as to be in a large degree meaningless; and injurious in that this absence of real significance is not realized by the general public, who would, naturally, be disposed to conclude the direct contrary from the fact that some sort of discrimination is now known to be exercised. Consequently the danger that Institute membership may be made to serve personal and improper ends is greater than before. The Council has, however, recognized and endeavoured to provide against, or at least minimize this possibility, by issuing at periodical intervals a list of the names of applicants, together with a statement of their alleged qualifications, to the membership at large, inviting members to scrutinize this list and to submit any criticisms they are in a position to afford concerning the status of candidates and which would affect their right to election. By this means the members as a whole are made to share with the Council any responsibility attaching to the admission of new members; but although these lists have now been issued for upwards of a year, as yet they have failed to elicit a single reply. Which, of course, presumes that all recent elections have been beyond reproach.

These, then, are in part the arguments for and against the present practice of membership classification. No doubt others could be adduced in support of contentions on either side. The question is worthy of consideration in view of the proposed revision of the by-laws this year, and it is to be hoped that members will take advantage of the present opportunity to present their views on the subject.

In conclusion, a word may be said on the Institute's recent policy of establishing branches throughout the country. The idea is not a novel one, even in the Institute, having been first suggested and partly carried into effect by Mr. Bell in 1902. It was also warmly advocated by Mr. Coste during his term of office in 1903 and 1904. The successful operation of the branch system, however, is of comparatively late date, and takes into account the organization of the Toronto, Cobalt, Montreal and Western branches. Of these, the Cobalt and Western branches are naturally the most important, and have served the most useful purpose; in fact, a large increase in membership during the past two years is chiefly due to the activities of these two branches, and of their executive officers, to whom the Institute is under considerable obligation. Until quite lately there has been much opposition in certain quarters to the establishment of branches, and even now some very able gentlemen hold the view that the expedient is a mistaken and dangerous one. Their ground for this belief is that branches foster and encourage localisms and sectional feeling; that they threaten to become a drain on the finances of the Institute, and, in brief, are likely to be a source of weakness rather than of strength. These ob-



jections contain, no doubt, at least a germ of truth, and it is well that they should be raised in order that any possible contingencies may be combatted before they actually arise. The Institute's chief claim to recognition, its power for good, is on the score of nationalism. As a national organization it is in a position to accomplish what would be otherwise impossible. This should be, and of course is recognized by every member, whether he belongs or not to a branch organization. The principle is precisely the same as that which governs the world by maintaining the individuality of nations. The branch, as such, is a small organization within a larger one, and its main function is comparable to that of a colony in its relation to an empire of which it is an integral part. Branches were originally established to meet conditions peculiar to this country. The centres of mining activity in Canada are widely scattered, and

spread across a continent. It was realized that a great majority of members could not, by reason of these great distances, attend meetings; that it was difficult to keep in touch with them from headquarters, and that consequently they were apt to become indifferent to the Institute, or lose interest in it altogether. The only feasible way to overcome these difficulties was to create enthusiasm by local organizations, and by providing machinery whereby men residing in the same locality might meet as members of the Institute in common cause. It was originally intended that these local branches should become more than this. So far, the plan has proved most effective; but nowhere as at Cobalt, thanks in part to the naturally favourable conditions and environment, but more especially to the enthusiasm, notably that of the secretary, Mr. Cole, of the men who have taken a prominent part in the organization and administration of the branch.

## THE DEVELOPMENT OF HEAVY GRAVITATION STAMPS.

\*By W. A. Caldecott, Member.

The history of ore crushing by means of gravitation stamps shows a progressive increase in their weight and in corresponding efficiency. This holds good in the development from the square wooden non-rotating stamps in use in Germany in the Middle Ages<sup>1</sup> to iron-shod wooden stamps in Cornwall, and then to rotary iron stamps in South Africa. The latter have greatly improved during the last few years, and probably represent the highest existing stage of development. About 1835, the first stamp mill in the United States was started at Tellurium, Virginia.<sup>2</sup> The stamps weighed 50 lb., and were made of square wooden stems with iron shoes and dies, the cams operating in slots in the stems.

Ten years later the Vauclease Mine installed 380-lb. stamps, of which the head weighed 125 lb. When the first batteries were erected on the Rand over 20 years ago, Californian practice probably represented the highest state of the art, and was introduced upon these fields by J. S. Curtis, J. H. Hammond and other well-known Californian mining engineers.

To illustrate the type of battery in operation on the Rand in 1889, in which year the writer's experience of stamp-milling began, the following details may be given of the Du Prez Gold Mining Co.'s mill, premising that this was before the introduction of the cyanide process, and that concentrators, other than blanket-strakes and buddles, were not in common use.

The mill was erected in that year, and was of Sandy-croft make, designed in accordance with the best Californian practice to date. It consisted of 20 stamps

weighing 900 lb. each when new, and was run at the rate of 90 7-in. drops per minute. The stamp duty was about 3 tons per 24 hours, using a screen of 900 meshes per sq. in.

By 1899 some progress had been made and 1,250-lb. stamps were in use at the Robinson Gold Mining Co. and elsewhere, though in Australia and the United States 900 lb. per stamp remained the almost universal maximum limit, and this remains true of the celebrated Homestake mills at the present time. At the Mount Morgan Gold Mining Co. (Westralia), in December, 1902, 30 stamps weighing 1,500 lb. each were erected. These were eclipsed, however, by the neighbouring Millionaire Gold Mining Co.'s battery of five stamps weighing 1,750 lb. each.<sup>3</sup> The advance made on these small companies was not generally realized, and in 1907 few stamps dropping on the Witwatersrand weighed above 1,250 lb., with the exception of certain batteries of Consolidated Goldfields companies, as will be noted later.

In 1904, the author was authorized by Mr. R. M. Catlin, Acting Consulting Engineer of the Consolidated Goldfields, to carry out a series of milling tests at the Knights Deep battery, which was equipped with stamps weighing 1,350 lb. when new. The object of the trials was to discover some means whereby stamp-milling efficiency could be increased.

The initial experiments were made to test the effect of fine breaking before stamp-milling, and also whether the increased discharge area afforded by a double discharge mortar-box increased the stamp duty. A pair of rolls was installed to effect the preliminary fine breaking, and also a double discharge mortar-box. A

\* Paper read before the Institution of Mining and Metallurgy.

<sup>1</sup> See Remarks by Bennett H. Brough, Proc. Inst. of Civil Eng., vol. cviii. (1892), during discussion upon paper by A. H. Curtis on "Gold Quartz Reduction."

<sup>2</sup> See Crane's "Gold and Silver," p. 473 et. seq.

<sup>3</sup> See Special Edition of Australian Mining Standard, December 8th, 1904; also JI. of Chem. Met. & Min. Soc. of S. A., vol. vii, September, 1905, p. 92.



staff of men was specially employed to carry out the trials, and most complete and detailed records were kept.

The tests extended over more than a year, and a considerable amount of money was expended in testing many variations of conditions, such as varied angles of screen frames, heights of discharge and of drop, and different methods of water introduction into the upper portion of the mortar-box.

The following statement illustrates some of the many experimental runs:—

|                                                                 | (A)<br>Single Discharge<br>Mortar.<br>Ordinary Mill<br>Feed. | (B)<br>Single Discharge<br>Mortar.<br>Ore from Rolls<br>set 0.5 in. apart. | (C)<br>Double Discharge<br>Mortar.<br>Ordinary Mill<br>Feed. |
|-----------------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------|
| Running Weight of Stamp ....                                    | 1343 lb.                                                     | 1342 lb.                                                                   | 1356 lb.                                                     |
| Set Height of Drop .. . . . .                                   | 7½ in.                                                       | 7½ in.                                                                     | 7½ in.                                                       |
| Drops per minute . . . . .                                      | 98                                                           | 98                                                                         | 98                                                           |
| Duty per Stamp per 24 working<br>hours . . . . .                | 5.85 tons                                                    | 5.68 tons                                                                  | 5.81 tons                                                    |
| Height of Discharge . . . . .                                   | 2¾ in.                                                       | Level                                                                      | 3¾ in.                                                       |
| Screen used and Aperture ....                                   | 700<br>(.024 in.)                                            | 700<br>(.024 in.)                                                          | 700<br>(.024 in.)                                            |
| Ratio of Water to Ore by Weight                                 | 7.67 to 1                                                    | 8.35 to 1                                                                  | 10.70 to 1                                                   |
| Percentage of + 60 (0.01 in.)<br>grade in screen pulp . . . . . | 29.00 %                                                      | 27.50 %                                                                    | 26.00 %                                                      |
| Ore Feed + 1½ in. . . . .                                       | 54.8                                                         | 1.1                                                                        | 49.9                                                         |
| - 1½ + ¾ in. . . . .                                            | 14.3                                                         | 19.3                                                                       | 16.3                                                         |
| - ¾ in. . . . .                                                 | 30.9                                                         | 79.6                                                                       | 33.8                                                         |

The results of the above typical trials with a double discharge mortar-box and with fine breaking before stamp-milling are almost identical within the limits of experimental error.

The above conclusions were confirmed by the fact that the average stamp duty on ordinary mill-feed for six pairs of parallel trials was 5.82 tons with a double discharge mortar, and 5.82 tons with a single discharge mortar.

The average stamp duty for four pairs of parallel trials on the product of rolls set ½ in. apart was 5.64 tons with double discharge mortar, and 5.78 with a single discharge mortar. There was no increased duty to compensate for the extra cost of preliminary fine breaking,\* and the only difference with the double discharge mortar-box was a considerable increase in the amount of water used.

This last conclusion is in accordance with the fact that the ordinary single battery screen has about 40 per cent. of its area available for discharge, or, say, 1½ sq. ft. of discharge area for the small stream of pulp yielded by five stamps.<sup>5</sup> It will be observed that in trial (B) many flat pieces of ore which had passed the rolls set ½ in. apart yet remained on a coarser screen used in the grading analysis.

Finally it became obvious that to crush more rock it was necessary to strike a heavier blow. This was sought by affixing helical springs round the stem above the tappet so as to be compressed by the upper guide during the stamp's rise, and so that when released the

stamp would fall more rapidly, rendering a higher drop practicable, and would likewise strike harder. Whilst this object was in some measure fulfilled, the noise in the mill was much increased and the life of the springs did not promise to be long. Hence, finally, the conclusion was reached that a simple increase of stamp weight was the best course.

A series of runs were then made, whereby direct comparisons could be obtained of the actual tonnage milled by alteration in the weight of stamps. The table on p. 5 exemplifies the increased tonnage obtained by increased weight of stamp on ordinary mill feed, both under ordinary milling conditions and with a high discharge and back water feed to obtain a very fine product.

Another run with 1,337-lb. stamps having a height of discharge of 2 in. and a 64-mesh screen gave a duty of 10.23 tons per 24 working hours, of which 52.8 per cent. remained on a 60 screen. The water-feed adopted in this test consisted of inlets at an angle of 45 degrees at the back of the mortar-box, as suggested by the late Mr. H. T. Pitt.<sup>6</sup>

Encouraged by the results of these and many other tests, including a duty of approximately 6½ tons through 1,500-mesh screening with stamps weighted up to 1,622 lb., the writer felt justified in recommending that the next 360 stamps erected by Consolidated Goldfields Companies, namely, at the Simmer East, Robinson Deep and Luipaards Vlei, should have a weight of 1,550 lb. each when new.<sup>7</sup>

Such a departure excited much adverse comment among experienced millmen generally, on the ground that no foundations could stand the shocks, but the reasoning that if foundations could be built to endure the blow of the colossal steam stamps, it would be possible for them to be built to withstand gravitation stamps, proved correct. All the above mills are satisfactorily at work to-day after periods of service ranging up to three years, and the foundations promise to last as long as did their lighter predecessors.

In accordance with the present changed state of professional opinion, all Rand batteries lately erected or designed have stamps of a weight not long ago deemed extravagant, and aided by the installation of tube-mills, stamp duties of 8 tons are as common as of 4 tons but a few years previously.<sup>8</sup>

Whilst in the United States and in Mexico the relatively light stamp is still generally upheld, there is at least one notable exception in the recently built mill of the Boston Consolidated Copper Co., which is equipped with 312 single Nissen stamps of 1,500 lb. weight each and with a 9-ton duty.<sup>9</sup>

The accompanying diagram, Fig. 1, illustrates a modern heavy gravitation stamp with its mortar-box, as used in the Simmer Deep Jupiter joint mill.

The tabular statement illustrates the results obtained on a large scale under regular working conditions by the use of heavy stamps, and further shows in

<sup>6</sup> See Trans. Inst. M. & M., 1904, vol. xiv, p. 164; also Journal Chem. Met. & Min. Soc. of S. A., 1908, vol. viii, p. 374.

<sup>7</sup> See Annual Report of Con. Goldfields of So. A. for 1905, p. 32; also Report for 1906, p. 27, and Report for 1907, p. 28.

<sup>8</sup> See the S. A. Mining Journal, p. 802, Sept. 19th, 1908; p. 1016, Nov. 14th, 1908; p. 1100, Dec. 5th, 1908; and p. 1348, Feb. 6th, 1909; 1860-lb. stamps with a 12-ton estimated stamp duty are to be erected on the West Rand Consolidated property (South African Mining Review, p. 232, Nov., 1908).

<sup>9</sup> See Eng & Min. Jour., 14th Sept., 1907, p. 433.

\* See also Journal of C. M. & M. Society of S. A., vol. vi, Jan., 1906, p. 215.

<sup>5</sup> See Lock's "Gold Milling," p. 79.

the case of the Simmer East that whilst stamps alone can be used with a high discharge to produce a fine product, yet the later use of tube-mills as well yielded at the same total cost a product with fewer coarse

stamp batteries side by side in the Simmer East mill the one with a concrete block only, and the other with cast-iron anvil block as well, shown in the accompanying Figs. 2 and 3.

| Apertures per sq. in. in screen used. | Running weight of Stamps in lb | Set Height of Drop. | Height of Discharge. | Tons of Water used per ton of Ore | Tons of Ore crushed per stamp per 24 working hours. | % of + 60 (0.01 in.) grade in screen pulp. |
|---------------------------------------|--------------------------------|---------------------|----------------------|-----------------------------------|-----------------------------------------------------|--------------------------------------------|
| 981 (0.021 in.) .....                 | 1196                           | 8 in.               | 3 in.                | 5.8                               | 5.88                                                | 22.63                                      |
| " " .....                             | 1279                           | "                   | "                    | 5.8                               | 6.58                                                | 22.23                                      |
| " " .....                             | 1531                           | "                   | "                    | 5.7                               | 6.74                                                | 20.86                                      |
| 1512 (0.016 in.) .....                | 1216                           | 8 in.               | 11 in.               | 5.40                              | 4.26                                                | 5.16                                       |
| " " .....                             | 1288                           | "                   | "                    | 5.30                              | 4.29                                                | 4.91                                       |
| " " .....                             | 1293                           | "                   | "                    | 5.43                              | 4.55                                                | 9.49                                       |
| " " .....                             | 1337                           | "                   | "                    | 6.27                              | 4.96                                                | 6.66                                       |
| " " .....                             | 1562                           | "                   | "                    | 5.05                              | 5.17                                                | —                                          |
| " " .....                             | 1605                           | "                   | "                    | 6.30                              | 6.02                                                | 11.66                                      |

(+0.01 in.) particles, and hence a still more perfect exposure of the gold.

Somewhat later than the series of battery tests already described, the matter of battery foundations was also investigated. It was recognized that timber foundations were unsuitable for heavy stamps, their liability to decay rendering them less durable than the then recently introduced cast-iron anvil blocks. However, it had never been practically proved since the

The results of the parallel trials were on the average practically identical. These extended from the use of 100-mesh screening to 1,400-mesh, and the cast-iron anvil block battery showed an average stamp duty of 6.84 tons as against 6.78 tons for the concrete block, the average screen grading analysis of the latter showing, however, only 25.00 per cent. of + 60 (0.01 in.) grade as against 26.76 per cent. for the cast-iron anvil block.

The question of the life of the concrete block with

|                                                          | LUIPAARDS VLEI.                     | SIMMER AND JACK EAST.                 |                                            |
|----------------------------------------------------------|-------------------------------------|---------------------------------------|--------------------------------------------|
|                                                          | (August, 1908.)                     | (May, 1907.)                          | (January, 1909.)                           |
| Tonnage milled during month .....                        | 18,807 tons                         | 35,500 tons                           | 29,600 tons.                               |
| Number of Stamps .....                                   | 60                                  | 250                                   | 130                                        |
| New Weight of Stamps .....                               | 1629 lb.                            | 200 at 1550 lb.                       | 1550 lb.                                   |
|                                                          | (with 18½ ft. stem)                 | 50 at 1350 lb.                        |                                            |
| Running Weight of Stamps .....                           | 1520 lb.                            | 200 at 1450 lb.                       | 80 at 1450 lb.                             |
|                                                          |                                     | 50 at 1250 lb.                        | 50 at 1550 lb. (with compensating weights) |
| Average Drops per minute and Set Height of Drop .....    | 98.6 at 8½ in.                      | 96 at 8 in.                           | 96 at 8 in.                                |
| Duty per Stamp per 24 working hours .....                | 9.667 tons                          | 5.006 tons                            | 8.333 tons.                                |
| Height of Discharge .....                                | 4 in.                               | 9 in. (average)                       | 3½ in.                                     |
| Screen used and Aperture .....                           | 200 (0.056 in.) and 250 (0.046 in.) | 1600 (0.016 in.) and 1200 (0.017 in.) | 200 (0.057 in.) and 400 (0.035 in.)        |
| Ratio of Water to Ore by Weight .....                    | 8 to 1                              | 8 to 1                                | 6.46 to 1                                  |
| Percentage of + 60 (0.01 in.) grade in screen pulp ..... | 43.7 %                              | 10.92 %                               | 1.61 % (final pulp).                       |
| Cost of Crushing per ton of ore—                         |                                     |                                       |                                            |
| (a) Stamps .....                                         | 1s. 3.879d.                         | 1s. 10.424d.                          | 1s. 3.672d.                                |
| (b) Tube Mills .....                                     | 6.215d.                             | —                                     | 7.070d.                                    |
| (c) Total .....                                          | 1s. 10.094d.                        | 1s. 10.424d.                          | 1s. 10.742d.                               |

introduction of these anvil blocks that they were superior to concrete foundations in themselves, and that this point might be elucidated the author in 1906 had a series of 23 comparative trials carried out on two five-

out timber or a cast-iron anvil block has received attention also, and one mortar-box, erected on Mr. H. C. Behr's recommendation at the Simmer East Mill, upon a concrete block with only a thin layer of insertion



between, has been in use now for three years with no visible sign of cracking or deterioration. This has been so encouraging that at the Simmer Deep and Jupiter mills all the batteries have been erected with the mortar-box resting on the concrete blocks.

Crushing is usually performed either by impact or abrasion, and whilst hard ores are best dealt with by the former method, the latter is applicable to softer material. The relative efficiency of the two methods for hard material is well illustrated by the case of the diamond,

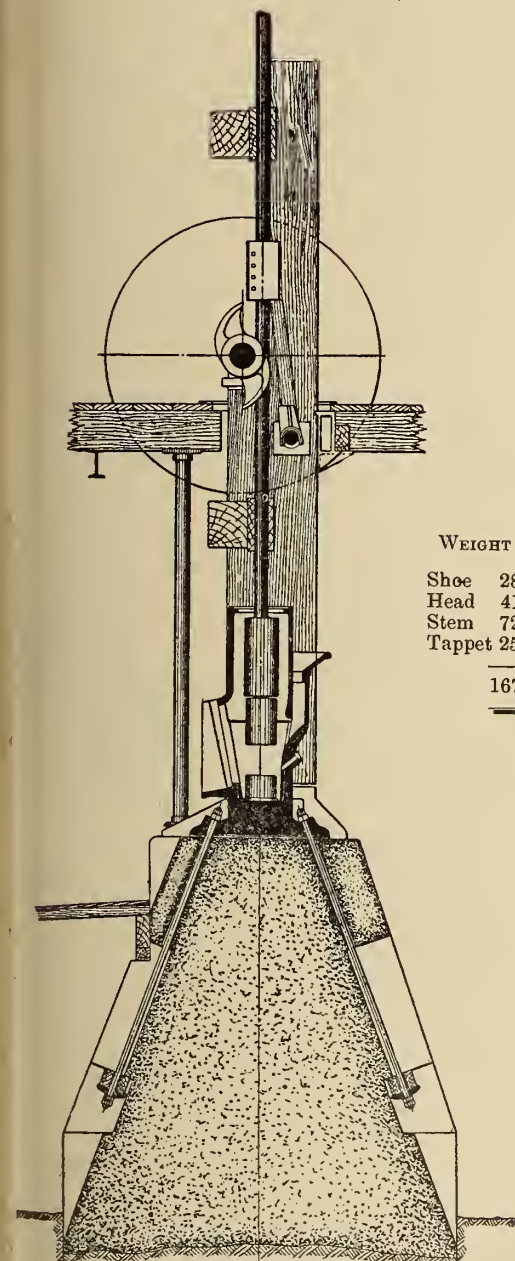


FIG. 1.

#### WEIGHT OF STAMP (NEW).

|        |         |   |           |
|--------|---------|---|-----------|
| Shoe   | 285 lb. | = | 17.066 %  |
| Head   | 410 "   | = | 24.551 %  |
| Stem   | 723 "   | = | 43.293 %  |
| Tappet | 252 "   | = | 15.090 %  |
|        | 1670 "  | = | 100.000 % |

elastic limit of the ore, and rupture results.<sup>10</sup> The stamp is essentially an impact machine, and hence readily pulverizes hard tough ore.

Such ore, if handled in any of the legion of rubbing or shearing appliances, would only be reduced at the expense of serious wear by abrasion of costly steel parts which may have to be discarded when but a fraction of their weight has been worn away. With soft material the case is different, and machines of the latter class may be employed with advantage and without undue abrasion of wearing faces.

It is much to be regretted that no satisfactory machine for testing the capacity of material to resist abrasion, or conversely of testing the abrasive capacity of materials requiring abrasion, yet exists, as this property is of prime importance in all crushing operations.

When gravity stamps are used for very fine crushing they pass beyond the economic range, and operate by abrasion rather than by impact, with consequent reduction of efficiency, as may be seen from the following considerations. Impact is essentially dependent on the pressure exerted by the blow, and depends upon the

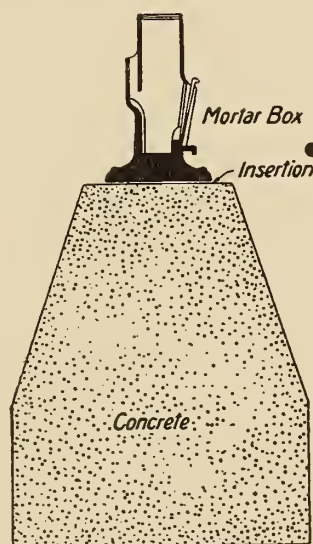


FIG. 2.

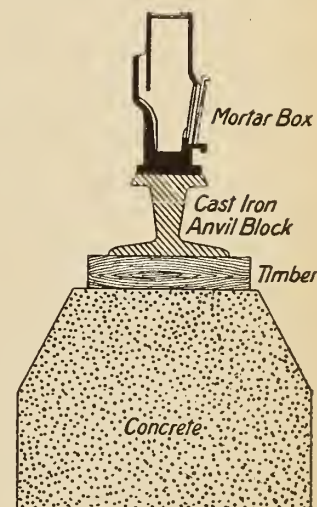


FIG. 3.

which is hardly capable of abrasion at all except by its own dust, whereas, if placed on an anvil, it will be shattered into a thousand fragments by one blow of a hammer.

As has been pointed out by C. de Kalb, the crushing of the larger pieces of ore in stamp milling is done as the result of reaction from the resilient die, the waves of compression transmitted through the ore from the shoe being reflected from the die, until the strains set up from the oncoming and reflected waves exceed the

weight of the stamp and the height of the drop. Assume that a 1,750-lb. stamp having a 9.5 in. diameter shoe and with a set height of drop of 8 in. strikes a layer of ore 2 in. thick on the die, and comes to rest 0.5 in. from the die. Then having fallen 7.5 in. and having done work for 1.5 in., it has exerted on the ore a mean total pressure of 8,750 lb.<sup>11</sup> The shoe having an area of 71 sq. in., the average unit pressure exerted over the whole of its area is only 123 lb. per sq. in., or less than that exerted by a man of average weight supported upon an area of 1 sq. in.

The crushing effect of such a pressure on hard quartz grains is trivial, and a certain amount of reciprocal abrasion of grains of sand re-arranging themselves under pressure is probably the main effect produced. The case, however, is quite different in the first impact of the stamp on the ore in the box. Assume that only a 2 in. cube resting on the die is first struck; having an

<sup>10</sup> See *Mines and Minerals*, p. 135, Oct., 1906; O. H. Howarth in *Mines and Minerals*, p. 441, May, 1906; and *Journal Chem. Met. and Min. Soc. of S. A.*, vol. vi, June, 1906, p. 385.

<sup>11</sup> Cf. Hiseox, "Compressed Air," p. 437.



area of 4 sq. in., the average unit pressure here is 2,190 lb. per sq. in., or eighteen times as much as under former conditions.

The finer the crushing is carried in the battery the longer sand particles remain before sufficiently reduced to escape, and the higher the ratio of fine to coarse material in the mortar-box. Hence, under these conditions the liability is for the falling stamp to have its force of impact distributed over so large an area as to produce little effect but abrasion on a bed of shifting compressible sand. These considerations serve also to explain why fine breaking before milling with heavy stamps does little good. A large number of pieces of ore of approximately equal size afford a large area to receive the blow of relatively small pressure upon each. And further, the abrasive action, above referred to, explains why stamp milling with a fine screen and a high discharge, or both combined, is inefficient through the waste of energy in converting fine sand into slime by abrasion of the particles re-arranging themselves under the stamp.<sup>12</sup>

As regards the desirable size to which ore should be broken before entering the mortar-box, the disadvantage of too fine crushing yielding a uniform bed has already been pointed out. The maximum limit varies with the class of ore, being less for hard ores, but in general it should be such that not more than one blow of a stamp is required to pulverize the largest piece of rock. Hence the heavier the stamp, the coarser the preliminary breaking admissible, and vice versa. With unweathered blanket ore probably a maximum diameter of  $1\frac{3}{4}$  in. is permissible. Larger pieces are more economically reduced by the rock-breaker and the lowering of stamp duty, owing to less actual height of drop with such a feed, is thus avoided.

In passing it may be said that the practice of placing the breakers under the control of the mine captain, who when ore is coming up freely from below avoids congestion in his bins by opening out the breakers wide, is not to be commended. The object sought is certainly achieved, but at the expense of inefficient stamp milling and greater strains on stems when the edges of the shoes fall upon large pieces of hard ore.<sup>13</sup> When the pieces of ore are too large to enter the feed opening of the mortar-box, and feeding consequently ceases, the results are of course even worse.

Taking the average running weight of a stamp as with a half-worn shoe and with a stem of less than its original length owing to breakage, it will be found that this weight is some 10 per cent. less than the weight of the stamp when new, and that its duty is correspondingly reduced. The obvious remedy is the use, as the shoe wears down, of compensating weights in some form or other, which have been frequently suggested and occasionally used.<sup>14</sup>

Since, however, greater attention has been directed to the weight of stamps through the trials on the Knights Deep referred to, the use of compensating weights has become common on the Rand, and their importance in maintaining a high efficiency and stamp duty is so considerable as to be well worth the small

additional trouble and expense involved by their use. Probably the earliest form of this device was placing an old head at the top of the stem or an extra tappet above the one in use.

These devices were, however, crude, and the writer has tried various other methods, including a false head intermediate between the true head and the shoe, on the ground that additional weight is better added near the bottom than near the top of the stem. Probably the most convenient compensating weights, however, are split cast-iron discs about 4 in. high and weighing about 50 lb. or 60 lb. each, which are clamped on the stem by means of two bolts either above or below the tappet. Such a compensating weight is illustrated in the accompanying Fig. 4, and as many may be gradually added as are needed and can be accommodated.

With increased weight of stamp, the question of increased shoe and die area arises, but the considerations already advanced, showing the small amount of pressure per sq. in. of total shoe area, indicate that very large shoe and die areas are not needed for hard ore whilst for soft ore a lower, quicker drop can be used. Some increase, however, is usual owing to the fact that the larger diameter of stems and tappets required with

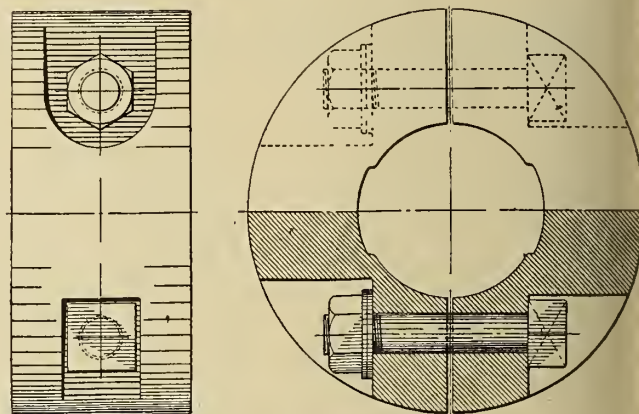


FIG. 4.

heavier stamps necessitates increasing the distance between stamp centres.

An increase is desirable when the total force of impact of the falling stamp requires a thick layer of ore on the die to avoid excessive shock. Such heavy feeding lessens the duty, because the thicker ore bed reduces the actual height of drop, and the blow is likewise cushioned so that the stamp crushes by abrasion rather than by impact. As already shown, the cushioning caused by fine particles in the mortar-box increases with the height of discharge and the fineness of the screen.

The greater the force of impact per unit of area the coarser the screen required for maximum efficiency, as otherwise a thick layer of fine ore particles would be needed to avoid pounding. Since even a heavy stamp crushes but a very thin layer over the surface of the die it is obvious that the least thickness of ore layer necessary to take the impact of the stamp without pounding is sufficient to supply ample material for pulverization.

The prevention of irregular wear of dies is as yet an unsolved problem. At first sight it would appear that a slight cavity in the die surface due to soft metal would, when formed, be protected against further excavation by the surrounding portions of the die standing

<sup>12</sup> See E. A. Hersam's paper on "Economy of Power in Crushing Ore," published in the Mining & Scientific Press, of 16th Nov., 1907, p. 624; also C. de Kalb in Mines & Minerals, p. 136, Oct., 1906.

<sup>13</sup> See T. A. Rickard's "Stamp Milling of Gold Ores," p. 151.

<sup>14</sup> See Lock's "Gold Milling," p. 109; also Journal of Chem. Met. & Min. Soc. of S. A., vol. ii, April, 1898, p. 299.



above it, but in practice no such protection seems to be afforded. The cavity grows steadily deeper with use, and even turning the dies regularly is not a cure.

In the writer's opinion the trouble is due to the larger pieces of ore, or pieces of steel such as drill ends, gravitating in the swirl of pulp in the mortar-box to the lowest point, that is into any slight depression originally due to softness of the metal, and thus the impact of the falling stamp is transmitted to gouge out the bottom of the cavity. Such irregular wear is especially liable to start at the back of the centre dies where the ore feed first lodges and is thus struck whilst at its largest size.<sup>15</sup>

Consequent upon the introduction of tube-mills, coarse battery screening has generally replaced the finer mesh, and thanks to the work of this Institution, and of the Chemical, Metallurgical and Mining Society of South Africa, more accurate descriptions are now applied to screening,<sup>16</sup> with the result that the millman can with some certainty obtain a duplication of a previous order.

In accordance with the demands of the modern millman armed with a micrometer gauge, manufacturers' catalogues, in place of giving vague trade terms, now detail diameters of aperture, wire and so forth, with a most laudable desire for extreme accuracy.

Since this development, however, the general introduction of secondary grinding by means of tube-mills has lessened the importance of the battery screen as a criterion of the degree of reduction of an ore, and, in fact, the grading analysis of the final pulp leaving the crushing plant as an overflow of the hydraulic classifiers is now the guide to the metallurgist.

As pointed out previously before this Institution, this change makes the degree to which a particle is reduced dependent on both its diameter and its specific gravity, instead of on the former only, with the result that the pyritic material undergoes that finer comminution and more perfect exposure of gold contents which its greater value renders desirable.<sup>17</sup>

Breakages of cam-shafts as well as stems and other battery parts are still commonly described as being due to "crystallization" set up by vibrations incidental to the operation of crushing. At the present day, however, such an explanation cannot be accepted, it having been proved that repeated shocks in time develop, in such essentially crystalline aggregates as iron or steel, minute microscopic crevices which gradually extend until a fracture results.<sup>18</sup>

Among the few who have initiated improvements in stamp mill design of recent years is that experienced millman, M. P. Boss, whose design of a stamp with long head, thus giving strength at what would otherwise be a weak point in the stem, is worthy of serious investigation.<sup>19</sup> It is somewhat remarkable that whilst the number of crushing machines invented to supersede stamps is endless, and much space in metallurgical publications is devoted to the description of crushing plants, yet the actual operation of the gravitation

stamp and the discussion of its most appropriate design has been but little dealt with either by the skilled engineer or by the mathematician.

In order to employ heavy gravitation stamps to full advantage, it is absolutely necessary that a uniform speed should be maintained by proper governing of the engine. Only under these conditions can the maximum speed and height of drop be safely used without fear of camming; and the damage done in a few moments by sudden increased speed above the normal may prove a costly matter both in loss of time and material. Further, with heavy stamps the use of five-stamp cam-shafts is very desirable, in that as compared with ten or fifteen-stamp cam-shafts both the power to be transmitted and the number of shocks due to lifting stamps are reduced by one-half or two-thirds for each shaft.

Many attempts have been made to supersede the use of gravitation stamps as the standard machine for the crushing of gold-bearing ore, but without success. That, in spite of certain obvious disadvantages, they still hold their own, is probably due to the fact that pneumatic and steam stamps as hitherto designed have proved wasteful of power and liable to derangement under the vibrations and shocks inevitable during crushing, whilst the gravitation stamp has little to go wrong, and power can be cheaply developed by a complex and economical steam-engine removed from unfavourable conditions and tended by a skilled operator without other duties. A serious effort is, however, now being made to utilize a new type of Holman pneumatic stamp at the New Kleinfontein mill, and there is no doubt that the energy and experience of those concerned in this test will, if it is possible, overcome such difficulties as have been encountered in the past with similar crushing appliances.

From the foregoing discussion it will be evident that the day of the stamp as a unit of crushing capacity has passed away. The unit of the present basis is the tonnage crushed per month or per day, and this is dependent on many factors—the relative proportion of stamps to tube-mills, the actual running weight of the stamps, the ratio of water fed, the height of discharge, the height and number of drops per minute, the screening used, and the maintenance of "concert pitch" in the mill engine.

The future limit of stamp weight is difficult to foretell, but it will probably be determined more by the mechanical considerations involved, as in the cam system of lifting, than by any decreased relative efficiency as a device for pulverizing ore.

The advantages of heavy stamps, as compared with lighter ones, may be briefly stated as follows:—

1. Reduction of the initial capital expenditure in erecting, say, 200 stamps at 1,750 lb. with accessories, in place of 280 stamps at 1,250 lb. each.
2. Reduction in size of mill building, almost proportionate to the less number of stamps.
3. 30 per cent. less shafting, belts and other moving parts to maintain.
4. 30 per cent. less labour required for dressing plates, lubricating moving parts, changing screens, and other work incidental to milling operations.

In concluding this somewhat lengthy, yet incomplete discussion of some of the factors affecting present day stamp-milling, it is my pleasant duty to acknowledge my indebtedness to the Consolidated Goldfields of South Africa, whose foresight provided means whereby a departure was rendered possible which, besides bene-

<sup>15</sup> See J.I. C. M. & M. Soc. of S. A., vol. vii, 1907, pp. 216 & 293; also paper by M. P. Boss on "Crushing Ore" published in The Mining & Scientific Press of March 14th, 1901, p. 356.

<sup>16</sup> See J.I. C. M. & M. Soc. of S. A., June, 1906, vol. vi, p. 393; also October, 1907, vol. viii, p. 130.

<sup>17</sup> See Trans. Inst. M. & M., vol. xiv, 1904, p. 55.

<sup>18</sup> See Rosenhain on "The Crystallization of Iron and Steel" in The Times Eng. Supplement, p. 1, 6th Nov., 1907.

<sup>19</sup> See Mines and Minerals, p. 209, Dec., 1908.



fitting the gold mining industry in general, has enabled them to claim "the heaviest stamps and the highest average stamp duties of any gold mining corporation in the world;"<sup>20</sup> and to Messrs. R. M. Catlin, H. H. Webb, and H. C. Behr and their staffs for greatly appreciated encouragement and suggestions during the progress of the experimental work detailed.

### A MODERN MINING PLANT ON THE RAND.

The following extract from the South African Mining Journal, describing the plant on the Simmer Deep-Jupiter, is most interesting. The reader will notice that many new features are incorporated in the equipment:—

"This plant has the distinctive feature of being entirely driven by electricity from the stamps right down to the last pumps in the extractor house. The 300 stamps, each of which weighs 1,670 lbs. when new, are driven in lots of 10 by separate three-phase motors of about 50 h.p. The drop is about 8½ ins. The pulp, after passing over the amalgam tables, is pumped to 12 classifiers. The underflow from these goes to four tube mills, 22 ins. by 5 ft. 6 ins., driven by separate 125 h.p. three-phase motors. The overflow from the classifiers gravitates to 12 conical sands separators. Here a complete separation of the slimes from the sands takes place. These sands separators are 6 ft. in diameter by 6 ft. 6 ins. They are provided with a movable diaphragm about 2 ft. from the nozzle to regulate their action. The underflow from these separators is pumped to a set of eight conical de-watering cones, 8 ft. 6 ins. by 9 ft. deep. The overflow from these cones passes to two others, the underflow from which gravitates back to the mill tailings launder, and the overflow goes to the slimes plant. It is being found that four of these cones are sufficient when run in conjunction with the two cones last referred to. This part of the plant was in the nature of an experiment, the outcome of which was more or less assured.

"The underflow from the de-watering cones, containing about 33-35 per cent. of moisture, is delivered on to the two continuous vacuum filters that are the feature of the plant, and were from the design of Mr. W. A. Caldecott, the consulting metallurgist to the Consolidated Gold Fields Group of Mines. These filters are in the form of circular tables, 29 ft. in diameter, the filter bed being 2 ft. 6 ins. wide, giving an area of 137 square feet, and make one revolution in about three minutes. Thus, a 1½ in. layer of sand is run on to the bed. A pump, giving a vacuum of about 7½ ins. of mercury, by withdrawing the air and water from below the bed, reduces the moisture in the sand to 16-17 per cent. A plough arrangement removes the dried sand from the bed. There are two of these filters at work, and they treat from 1,200 to 1,400 tons of sand per day. The filter bed is made by placing coir matting on slats about 4½ ins. apart. Unbleached calico is placed on top of the matting. The filter has to be renewed once in 24 hours, the time taken being about 45 minutes. The dried sands are mixed with a .025 to .030 per cent. KCN solution, and pumped to one of 8 sands tanks, 8 ft. 3 ins. by 50 ft., where they are distributed by the 'Butter and Mein' apparatus. These tanks are capable

of holding 750 tons of dry sand. The overflow from these tanks goes back to be mixed with more dried sand. The sand is given from two to three days' treatment, this being facilitated by applying a vacuum pump, the solution being finally delivered to two storage tanks of the same size as the sands tanks prior to going to the extractor house. When these tanks have been drained the sand is removed through holes on to shuttle belts 32 ins. wide, which in turn deliver to the two main belt conveyors 28 in. wide. There are six of these shuttle belts, but only three are used per tank at a time. The belt conveyors take the sand to ten sands leaching tanks (Blaisdell distributors being used), the first solution applied being about .12 per cent. KCN and the final about .025 per cent. KCN. From here the sands are taken by 20 cubic ft. trucks to the dumps. The circuit of the sand from the mill to the dump is only about 6½ days. From the time the sands are delivered from the mill to the time the sands are charged into the sands tanks is only about two hours. The advantage of this system is therefore obvious. The ordinary time taken is almost ten days for sands treatment.

"There are 16 tanks at the slimes plant, these being 70 ft. by 12 ft. to 17½ ft. deep at the centre, and are about the largest at present in use. Their capacity is about 400 tons of dry slime. A 12-in. centrifugal pump with 16 ins. suction and delivery can transfer 400 tons of dry slime with 43 per cent. of moisture in about 50 minutes. There are two of these pumps. A notable feature of this slimes plant is that the whole of the operations can be overlooked from a small building in the centre of the plant. All the solution from the slimes plant is passed through filter presses, of which there are three of 48 frames, 32 ins. by 32 ins., to remove any calcium carbonate and other matter that would interfere with or foul the precipitation. There are eight zinc boxes for the slimes solutions, and these treat about 2,500 tons of solution per 24 hours. There are 12 zinc boxes on the sands side of the extractor house, but only a portion of them are in use. About 66 per cent. of the dissolvable gold goes into the .025 per cent. KCN solution first mixed with the sand. This solution usually runs from 1.8 to 1.9 dwt. per ton, and only assays .01 dwt. on leaving the boxes. Separate boxes are kept specially for this solution. The sands themselves usually run about 3-3½ dwts. per ton. Other boxes are, of course, kept separate for the strong and the weak solutions. Three more tube mills will be installed shortly, as well as three new slimes settling tanks, two of which are in course of erection. This extension of the slimes plant has been found necessary from the increased length of time required to settle the slime in winter, and especially that from the dump rock now being partially milled. Next winter, when it is expected only fresh rock will be milled, the plant as extended will be capable of treating the 66,000 tons per month—its nominal capacity."

### ELECTRICAL POWER FOR RAND MINES.

The project for producing electrical power at the pitheads of the local coal mines in the neighbourhood of Johannesburg is one which promises commercial success in consequence of the contracts entered into with the Eckstein, Consolidated Gold Fields of South Africa, General Mining and Finance, Messrs. Goerz & Co., and other groups for a period of 20 years. The

<sup>20</sup>See Annual Report of the Consolidated Gold Fields of South Africa, Ltd., 1908, p. 30.



contracts entered into are estimated to amount to 100,000,000 units a year, with an ultimate requirement of 500,000,000 units, making this the largest electrical installation in the world. The Kalgoorlie Electric Company supplies many of the Kalgoorlie mines with power, also the Tramway Company and the Townships of Boulder and Kalgoorlie, and only requires 10,000,000 units annually. In comparison the magnitude of the land's requirements is fifty times as great. The price at which the contracts have been taken allows a substantial profit to the Power Company, even on the basis of the smaller supply now being generated, but with the enormous increase to be provided by the end

of 1910, the reduction of costs should allow a larger margin of profit, and still effect a considerable reduction in power costs to the mines. Seeing that many of the contracts involve the scrapping of large steam plants now at work on the largest mines, it is certain that such would not have been done if a considerable advantage were not assured through the change, but it will mean much more to such mines as the City Deep and all new mines, as it will save them the large expenditure for motive power in all their operations. New mines will, therefore, require to provide much less working capital than when they had to provide huge steam engines.

## EXCHANGES.

### **The South African Mining Journal, August 21, 1909.**

The S. A. Mining Journal pleads for concerted effort on the part of syndicates in prospecting for petroleum. It urges also upon the Geological Survey Commission the propriety of bestirring themselves in the same cause. In the same article our contemporary expatiates upon the origin of oil, referring to the distillation of petroleum from coal as the result of the intrusion of basaltic dykes as an established fact. We commend to the writer of the article Mr. Coste's paper on the origin of coal and petroleum.

### **The Colliery Guardian, September 10, 1909.**—Refer-

ring to the renewed crisis in the collieries of South Wales, the Guardian reminds its readers that it, the Guardian, stood alone in taking a less sanguine view of the Cardiff settlement, June 30th, which was heralded as a triumph of conciliation. Mention is made of the secular letter, recently issued by the Coal Owners' Association. Continuing, the Guardian wisely points out that "there can be no useful purpose served by attempting to discount the gravity of the situation. The fact is that the [Eight Hours] Act is practically unworkable in South Wales, and the position of the collieries has been rendered quite unworkable by the unreasonable and dictatorial obstruction of the workmen and their representatives. Everybody connected with the trade . . . is becoming unnerved by the uncertainty and insecurity of the market."

### **The Mining Magazine, Volume 1, No. 1, September,**

1909, (London, England.)—Many features of interest are set forth for attention in this first number. The Review of Mining occupies the first eight pages. Here are discussed the current mining affairs of South Africa, West Africa, Australia, Mexico, and other countries. Fourteen editorial pages follow. It may be noted that the last editorial, "The Price of Copper," indicates that The Mining Magazine believes that "production appears likely to keep pace with any anticipated consumption;

therefore, there is no reason to expect an increase in the price of copper, although there is no immediate fear of a further decline." Next comes the section assigned to "Special Correspondence." The letters from Johannesburg, Mexico, San Francisco, Denver, New York, and Redruth are good stuff. They are not merely a record of work done; they give one a bird's-eye view of general commercial, technical, and political conditions. "Metal Markets" and "Discussion" are followed by 28 pages of technical and general articles. Then, after five pages of summarized company reports, we find the same amount of space devoted to a "Précis of Technology," in which are numerous digests of current monographs, and bulletins. Three minor departments, "Current Literature," "Books Reviewed," and "New Publications," complete the magazine.

### **The Engineering and Mining Journal, September 18,**

1909.—The relation of mine explosions to earthquakes is a topic that generated a certain degree of heat between the Engineering and Mining Journal and that most respectable monthly, Mines and Minerals. Their exchange of editorial grape-shot was noted in these columns. The E. and M. J. held that the hypothesis that there is connection between the two phenomena is not unreasonable, and is supported by substantial arguments. Mines and Minerals laughed the laugh of scorn. Seemingly that laugh was premature. In the current number of the E. and M. J., Mr. W. A. Spalding develops a strong case for the existence of a connection between mine explosions and seismic disturbances.

A mine explosion, says Mr. Spalding, is not a natural phenomenon. It arises from a natural condition plus an artificial condition plus an accident. Now, although earthquakes are localized by the region of least resistance or of greatest pressure, seismographs inform us that minor tremors pass entirely round the earth, and are recorded thousands of miles away from the centre. . . . "A mine is an artificial pocket in the earth. At a time when gases are driven forward by compression—



when the earth's crust is flexed, buckled, broken by seismic action—what assumption is more natural than that they should find exit through seams and fissures to this place of least resistance? . . . There are times when, without any apparent local cause, underground chambers become filled with gas. Whether such gases are explosive or not, whether it requires the admixture of air or coal dust to render them explosive; whether they are actually exploded or not, is entirely foreign to the argument. We are simply tracing natural causes which supply the conditions favourable to accidents of this sort. . . . That the mine in which an explosion occurs is far removed from the locality of a proximate or concurrent seismic disturbance does not discredit the theory of relationship, in view of the wide range of stresses and strains previously discussed."

Mr. Spalding concludes his paper by quoting a series of Associated Press dispatches concerning the roaring well near Beloit, Wisconsin. The well was active for two weeks before the San Francisco earthquake and ceased on the day of the catastrophe. It appeared also to synchronize with the earthquake in Mexico. Similar phenomena have been noted in France.

### BOOK REVIEWS.

**Ore Dressing.** By Robert H. Richards, S.B., LL.D. Volumes III. and IV. Price, \$5 per Volume. The Set, 4 Volumes, \$20 (£4 4s.) net, postpaid. McGraw-Hill Book Company, 239 West 39th Street, New York.

To very few of our readers are any words of introduction necessary when mention is made of Richards' "Ore Dressing." The first two volumes appeared in 1903, and were regarded as practically a complete presentation of the subject. Changes, improvements, and investigations, however, have multiplied so rapidly in the art of concentrating ores that Dr. Richards determined to add a small supplement to the two volumes. Work on this was commenced in October, 1906.

So much material was collected that it soon became apparent that a new work, ranking in size with the previous volumes, would be necessary to cover the ground. The new work has therefore taken the form of Volumes III. and IV., in which the subject matter of Volumes I. and II. is added to, chapter by chapter.

Beginning with chapters entitled "General Principles" and "Preliminary Crushing," Volume III. treats successively of rolls, stamps, pulverizers, laws of crushing, preliminary washing, sizing screens, classifiers, hand-picking, jigs, fine sand and slime concentrators, amalgamation, miscellaneous processes of separation, and accessory apparatus. Short chapters on the laws controlling screening, classifying, and jigging appear also.

Volume IV. consists of two long chapters—Chapter XLI., "Summary of Principles and Outlines of Mills," and Chapter XLII., "General Ideas on Milling." In the former chapter 94 mills, representing milling practice in the principal mining centres of the world, are described. The latter chapter gives much practical information as to costs, power tests, process tests, etc., etc. Volume IV. concludes with an appendix of useful tables and an exhaustive bibliography. Bibliographies are also appended to every chapter.

Nearly every type of ore-dressing machine is noted by Dr. Richards. The numerous diagrams and half-

tones that illustrate the text are exceedingly useful. Whatever minor details the work may be open to criticism, it is, beyond question, one of the most complete and the most satisfactory of text-books.

There is always danger of the mine manager becoming enamored of one particular type of machine. Not seldom the agent's personal charms are the deciding factors in the manager's choice of equipment. This is particularly apt to be the case in isolated camps.

There is no doubt that the manager can best fortify himself to withstand the blandishments of the machine agent, and can most readily qualify himself to make a wise choice of equipment by arming himself with a copy of Richards' "Ore Dressing." He will then have at his disposal an array of facts and figures far greater than he can have accumulated in his own personal experience.

This, possibly, defines the function of the volume before us. They are guides to the engineer and millman. They give, in concentrated form, all available data concerning the principles and practice of ore crushing and ore concentration. While it is humanly impossible to make any such treatises absolutely comprehensive and exact, these volumes come well within both categories.

### CANADIAN PATENTS.

The following is a list of patents issued by the Canadian Patent Office on Sept. 7, relating to mining and metallurgy, and furnished by Fetherstonhaugh & Co. 5 Elgin St., Ottawa. Russel S. Smart, Resident:—

120338. A Meyer, J. W. Allison, St. Louis, Mo., apparatus for rolling wire glass and the like.

120339. Ditto.

120354. A. R. Frank, H. A. Halensee, Max Voigt, Friedenau, Germany, apparatus for manufacturing nitrogen compounds, Societa Generale.

120356. J. F. Monnott, New York City, compounds metal bodies and processes of producing same, Duplex Metal Co.

120371. A. A. McIsaac, P. McKinnon, Broad Church, N.S., safety devices for mine riding rakes.

120391. J. Hartness, Springfield, Va., methods of turning metals.

120392. Ditto for means of turning metals.

120393. W. J. Hough, Toledo, Ohio, processes of recovering precious resinous matter.

120414. W. C. Sharpe, Jr. and Sr., Eastfield, Louth, England, apparatus for the production of air gas.

### PERSONAL AND GENERAL.

Mr. Allan Greenwell, editor of the Colliery Guardian, London, left Toronto en route for England on Sept. 22nd.

Mr. Reginald E. Hore, of the Michigan College of Mines, has returned from Cobalt district. Mr. Hore leaves for Houghton in a few days.

Mr. H. G. Carmichael, McGill '08, who is in charge of the operations of the Night Hawk Mining Company, on Night Hawk Lake, passed through Toronto on Sept. 20th.

Mr. C. L. Constant, Jr., of C. L. Constant & Co., the newly organized firm of mining engineers and metallurgical chemists, 42 Broadway, New York, passed through



Toronto on his way to Cobalt. The object of the organization has been to gather together a number of recognized mining specialists qualified to deal with all the details of exploiting and operating mining properties and smelting propositions. The directors are the following: C. L. Constant, president and treasurer; Dr. Walter Harvey Weed, vice-president; C. L. Constant, Jr., secretary, and R. B. Lamb and Frank H. Probert.

### ARCTIC AMENITIES.

Where boreal breezes blow,  
Where lies eternal snow,  
There Peary, don't you know,  
Vows Cook did never go!

Where flares the Northern light  
To illumine the Polar night,  
There Cook, with all his might,  
Swears that he got all right!

Cook claims an errant cake  
Of ice him safe did take  
Just where the Pole all naked  
-D stands without a quake.

And Cook asserts that hog—  
That Peary—pinched his prog  
From out a cache of log—  
The most unseemly dog!

And now there's not a soul  
Cares aught about the Pole—  
That source of direful dole!  
That vaguest, vainest goal!

Our object, one and sole,  
Is not to find the Pole,  
But just to let the whole,  
Damned business drop!

## Industrial Notes.

Nine Deister tables and slimers are being placed in the new addition to the Coniagas mill, Cobalt, Ont; eight in the enlarged McKinley-Darragh mill, and two in the Temiscamingue new mill.

### THE SULLIVAN MACHINERY COMPANY.

The Sullivan Machinery Company announces that the Northern Canada Supply Co., Ltd., of Cobalt, Ontario, has been appointed agent for the Sullivan Machinery Company, covering Cobalt and other northern Ontario mining territory. Mr. Robt. T. Walker has associated himself with the Northern Canada Supply Co., and will give his attention to the sales of the Sullivan Rock

Drills, Hammer Drills, Air Compressors, Diamond Core Drills, etc. A liberal stock of these machines and their parts will be maintained at Cobalt, with improved facilities for serving customers.

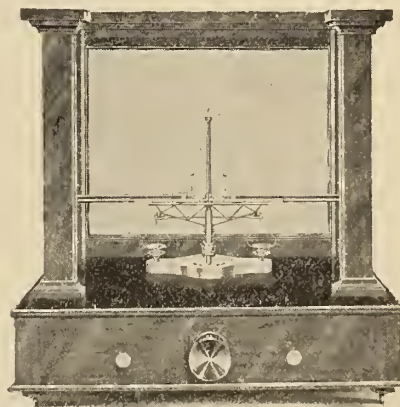
### A NEW INVERTED TYPE ASSAY BALANCE.

Recently in America there has been a revival of the inverted type balance, one of the earliest designs of European makers of precision balances, although now given an inferior position in their line, due largely to the more energetic development of the familiar type with dependent pointer or indicator.

The accompanying illustration shows a new model just put out by a leading maker and having numerous improvements over existing types.

The beam is of truss design, and made of hard rolled magnalium, an alloy equal in strength and of about one-third the weight of the brass or bronze commonly used, effecting thereby a reduction in the inertia of the moving parts, with a consequent increase in speed and sensibility.

The rider carriers have no metal-to-metal surfaces in sliding contact, hence are smooth in operation under adverse working conditions. The graduations are in



hundredths on a celluloid index, each division representing 1-100 of the weight of the rider used.

The end bearings are of one solid piece of agate, supported by agate contact points when at rest, and the releasing mechanism is of improved design, thereby eliminating the disadvantages of earlier balances of this type, operating absolutely without "kick."

The unit base carries the entire mechanism above the glass base, and maintains its perfect alignment under all conditions, and having less than one-half the parts of other balances of this type, its simplicity and the ease with which all parts may be removed for cleaning and replaced without disturbing their adjustment will appeal to the user at a great distance from the factory.

This balance is made by Wm. Ainsworth & Sons, makers of balances and engineering instruments of precision, Denver, Colorado, U.S.A., and is fully described in Bulletin A-16.

## SPECIAL CORRESPONDENCE

## ONTARIO.

**Cobalt.**—The results of the sale of 349 acres of mining lands in the Gillies Limit have been announced. Twenty parcels of land were offered, and of these fifteen were sold. Tenders received for the other five lots were not considered high enough, and were therefore not accepted. The fifteen lots sold brought in a total of \$109,943.50. In addition to these fifteen lots the Provincial mine was sold to F. M. Connell, of Haileybury, the purchase price being \$113,111, making the total proceeds of the sale \$225,054.50. In addition to the sale price a royalty of 10 per cent. of the gross proceeds of the sale of ore will be levied. The successful tenderers were as follows:—

|                                            |            |
|--------------------------------------------|------------|
| Lot A, 5—Geo. F. Webb, Hamilton, Ont. .... | \$7,709.00 |
| “ A, 8—Ben Sommer, Montreal .....          | 7,447.50   |
| “ A, 15—A. Pierce, Montreal .....          | 7,600.00   |
| “ A, 20—T. C. Simpson, Westmount .....     | 12,250.00  |
| “ A, 26—Geo. E. Martell, Renfrew .....     | 15,300.00  |
| “ A, 7—A. R. Flynn, Pittsburg .....        | 4,506.00   |
| “ A, 16—W. H. Legge, Toronto .....         | 3,502.00   |
| “ A, 19—A. R. Flynn, Pittsburg .....       | 6,511.00   |
| “ A, 33—A. R. Flynn, Pittsburg .....       | 2,706.00   |
| “ A, 34—A. R. Flynn, Pittsburg .....       | 2,706.00   |
| “ A, 31—Frank E. McDonald, Toronto .....   | 2,250.00   |
| “ A, 44—A. H. Jackson, Montreal .....      | 2,655.00   |
| “ A, 26—A. Pierce, Montreal .....          | 20,600.00  |
| “ A, 39—A. Pierce, Montreal .....          | 9,200.00   |
| “ A, 38—Bannell Sawyer, Montreal .....     | 5,011.00   |

The Buffalo mine has been working for a long time on its cyanide plant, to be used in connection with the concentrator, and at last has it in running order. The new plant has a capacity of 50 tons per day. For the treatment of the slimes a combination of mechanical and air agitation is used. The millmen of this district will watch the operation of the plant with a great deal of interest, as many of them have carried on extensive experiments along this line, and have come to the conclusion that a commercial success cannot be made of the cyaniding process as applied to cobalt ores.

It was stated a short time ago that development on the Waldman vein in the Gillies Limit had not been productive of very encouraging results. When the shaft was down about 15 feet the vein changed to calcite with a streak of barren cobalt, but when the work was down an additional fifteen feet the high-grade ore came in again, carrying practically as good values as were found on the surface. Sinking will be continued to the 100-foot level before any drifting is done, and in addition to this two diamond drills will be operated on the property in an effort to locate new veins. This company is at present leasing air from the Provincial mine, but as this property has now been sold, it is altogether likely that new arrangements will have to be made. It will not, however, be necessary for them to install their own plant, as the main pipe line of the Cobalt Hydraulic Power Co. passes within 100 feet of the property.

The 10-stamp concentrator at the Colonial mine has been completed, and the company is only awaiting the arrival of the air and electricity, when work will be started. Last spring mining operations were suspended, and since that time no work has been done.

It is generally understood that Montreal capitalists who are identified with the Crown Reserve mine have obtained control of the Silver Leaf, and the recent appointment of Colonel Carson, President of the Crown Reserve, and Mr. Cohen, who is manager of the same company, to the positions of president and consulting engineer respectively of the Silver Leaf, would seem

to point to the truth of these rumours. It was believed that the shares of the Silver Leaf were very widely scattered, but it now appears that the controlling interest was held by some New York people, and that they have sold the same at a price low enough to induce the buyers to consider the property. The Silver Leaf is capitalized at five million dollars, and up to date only about \$300,000 worth of ore has been mined. The main vein of the Crown Reserve continues into the Silver Leaf, but shortly after crossing the boundary the values pinched out.

Progress is being made with the addition to the Coniagau concentrator, which will double the capacity of the plant. A large part of the machinery is already on the ground, and the management is confident of having it in operation by the end of the year, provided the power companies have their electricity ready for distribution by that time. The addition has been designed to use electric energy, and the steam power equipment is only sufficient to operate the existing plant.

Part of the machinery for the extension to the Northern Cus-toms Concentrators has been installed, and the results obtained were very satisfactory. Two Nissen stamps were running for a short time to get an idea of their capacity. These were installed by the inventor under a guarantee to crush a certain amount of ore a day, and in the test that was given them they exceeded the guarantee.

The Townsite mine only commenced operations a short time ago, and up to date the results obtained have been very encouraging to the management. A new vein about 3 inches in width was discovered at the 110-foot level on the No. 7 shaft. It consists of cobalt carrying high values in silver. In a short time a cross-cut will be run to the west to catch a continuation of one of the main veins of the Buffalo. At the present time the main part of the work is being carried on from the Silver Queen shaft, where the company is stopping out a vein that cuts across the corner of the Townsite property, and already a considerable amount of high-grade ore has been taken out.

It is reported that one of the best veins on the Mann property in Gowganda was discovered Sept. 3rd. The new vein, which has been traced for some distance, varies in width up to 4 inches, and consists of high-grade ore.

Another drilling contest was held in Cobalt on Labour Day, Sept. 6th, and the first prize was awarded to the Nova Scotia team, who drilled 38½ inches. In a similar contest held a couple of weeks previously this same team was only able to drill 25¾ inches. All the other competing teams made a similar advance above their previous records, and this is largely due to the great strides made since the former test, when they were so hopelessly outclassed by Page and Pickens, the world's champions.

A short time ago a deputation representing several of the Cobalt mines called upon the officials of the department and petitioned that the heavy royalties which these have to pay should be reduced. Although no announcement has as yet been made, there are indications that such a reduction will be made. Should such be the case, the following mining companies would be benefitted: Chambers-Ferland, 16 per cent. royalty; Crown Reserve, 10 per cent.; O'Brien, 25 per cent.; Temiskaming & Hudson Bay, 15 per cent. Besides these companies paying a royalty to the Ontario Government, the following companies have to pay a similar royalty to the T. & N. O. Railway commission. These are: Right of Way, Townsite, Nancy Helen, City of Cobalt, Station Grounds, Jackpot, Wright and Railway Reserve, all of which pay 25 per cent.

Since the installation of the new 6-drill compressor at the John Black Mining Co. the work is progressing much more



rapidly. At the present time drifting is being carried on at the 100-foot level, and some good ore is being taken out. The shaft is being sunk to the 200-foot level, and from that point a cross-cut will be run about 300 feet, where it is expected to cut the Ophir vein. Several new camp buildings are being erected.

It is understood that the Cobalt Lake will ship a car of high-grade ore in a short time.

The Silver Mines Exploration Co. has declared its regular dividend of  $1\frac{1}{2}$  per cent., and an extra bonus of  $3\frac{1}{2}$  per cent., payable Sept. 16th.

The Crown Reserve Mining Co. has declared its regular quarterly dividend of 6 per cent., and also an extra bonus of 9 per cent. On August 30th the cash on hand and ore in transit amounted to \$912,000. After paying the quarterly dividend the surplus will be \$647,000.

The Buffalo Mines has declared its regular quarterly dividend of 5 per cent., payable Oct. 10th, and an extra dividend of 3 per cent., payable Nov. 5th. Up to date this company has paid 59 per cent. of the capitalization.

The Temiskaming & Hudson Bay Mining Co. has declared a dividend of 300 per cent.

A 5-drill compressor has been installed at the Last Chance mine, which is located near the town of Latchford. This company has lately found good values at depth, and the force of men has been doubled and the work is being pushed as rapidly as possible.

At the present time there is a force of nearly one thousand men engaged in the construction of the plant of the Mines Power, Limited, and good progress is being made in the different branches of the work. The poles for the transmission line have been erected, and the work on the sub-stations for the distribution of the air and electricity at Cobalt and Kerr Lake is making good headway. The Cobalt sub-station is being built on the Nipissing property on the south side of Cobalt Lake, and the one which is to serve the Kerr Lake district is being built at Brady Lake. Large compressors will be installed in both these sub-stations, and air will also be connected by a 10-inch main, so that in case of breakdown at either place, there will be no interruption of the supply of air.

At the eleventh hour the Provincial Government has realized the gravity of the fever situation in Cobalt, and has sent several special inspectors to look after the work of cleaning up the town. A great many nurses have been sent in from outside points, and a number of tents have been erected to serve as hospital camps. It is hoped that the methods now being employed, together with the colder weather, will be successful in checking the disease.

Active development work is being carried on at the Temiskaming & Hudson Bay, and it is understood that several very promising discoveries have been made within the past few weeks. In a short time the management expect to sink a winze below the 200-ft. level, and from the bottom of this drifts and cross-cuts will be run to catch several veins. A few days ago the Coleman Township properties of this company were transferred to the Hudson Bay Mines, Limited, which has a capital of \$3,500,000.

At the Nipissing Mine, vein No. 122, which was discovered on the surface some time ago, has been traced for 820 feet. This vein has been cut underground at two points, 520 feet apart and 80 feet below the surface and in both places shows high grade ore.

Some excellent samples of niccolite ore were recently brought into Cochrane. These were stated to have been broken from an outcrop a few miles from the town. It was in this section that the International Nickel Co. were working diamond drills on a large nickel deposit on which they had an option.

Some time ago the machines were taken off, but no announcement has been made as to the results obtained.

Mr. W. P. O'Brien, on behalf of the Imperial Crown and Silver Leaf, denies the report that these companies will amalgamate. A special general meeting of the Silver Leaf Co. will be held in Toronto on Sept. 27th to confirm by-laws passed by the directors.

Recent development at the Silver Cliff mine has much improved the outlook at that property. Drifting is now being carried on on Nos. 1, 2 and 3 veins, and some very good ore chutes have been encountered. At present operations are confined to the main tunnel, which is now in 400 feet. A winze has been sunk to a depth of 80 feet below the tunnel, and from the bottom a cross-cut is being run to catch the No. 1 vein. The foundations for the new concentrator have been started, and the work will be pushed as rapidly as possible.

During the past month a large number of prospectors have been going into the new gold fields in Whitney Township, which is 65 miles by canoe from Driftwood City. A large number of claims have been staked, and some very fine specimens of gold quartz brought out. The veins in this section are very similar to those in Munro Township, and are narrow, but rich.

The addition to the concentrator at the King Edward mine is now complete, and the company only await the delivery of power in order to re-commence operations. There is a large quantity of milling ore on hand but as the enlargements to the concentrator were made with a view to using electric power, operations will be delayed for some time.

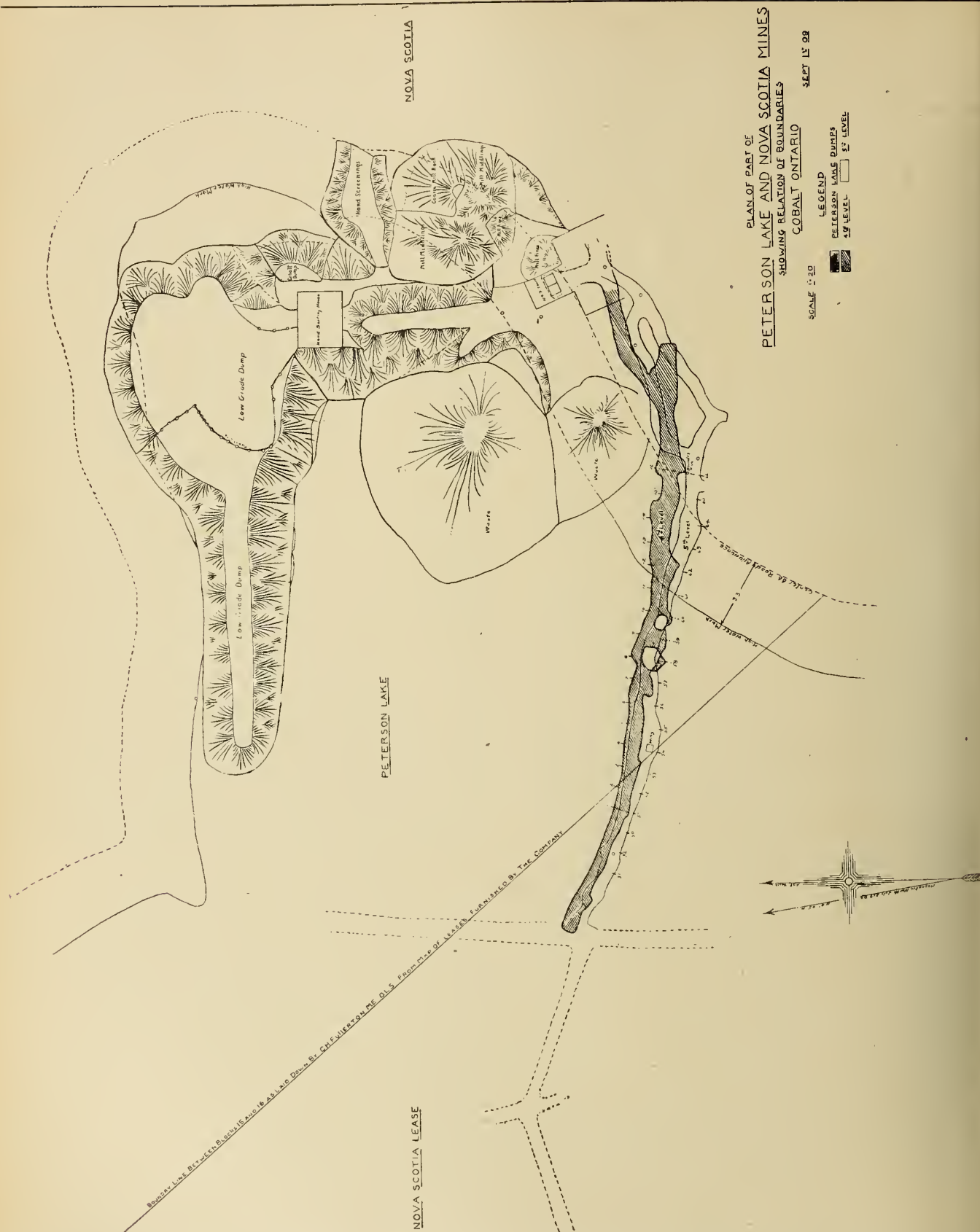
On Sept. 15th the assay building at the Trethewey mine was destroyed by fire. The prompt action of the brigade from the Coniagas was undoubtedly the means of preventing some of the other buildings being burnt.

The Nipissing Central Railway, which is to connect Cobalt, Haileybury and New Liskeard, expect to have their rails laid by the last of November. The contract has been given to the Algoma Steel Co., and several carloads have already been received. The contract for four passenger cars has also been let. The only hitch at present is over the bridge crossing the T. & N. O. tracks on the southern edge of Buck Township, and it is expected that this matter will be settled next week by the Railway Commission.

The trouble between the Nova Scotia Mining Co. and the Peterson Lake Mining Co. has culminated in an action against the Nova Scotia for the recovery of one million dollars, and to restrain the Nova Scotia from trespassing on the Peterson Lake property. The report of the Peterson Lake engineer shows that the Nova Scotia has trespassed upon the Peterson Lake property not included in its lease, and has removed a large quantity of ore to which it had no title. The report also shows that the ore was handled without regard to the Peterson Lake interests, and that due care was not exercised to separate the ore taken from the different properties. It also appears that no returns were made to the Peterson Lake from one car of ore shipped from its property, and that improper deductions have been made in freight and smelting charges. The trouble is partly the outcome of the want of independent management of the two properties. The Nova Scotia has been working one of the Peterson Lake claims on a royalty basis. The annual meeting of the Peterson Lake Co. will take place on October 6th.

About twenty-six miles of the wagon road between Elk Lake and Gowganda has already been completed. The road is in first-class shape, with very easy grades, and it is reported that next summer an automobile line will be in operation between the two places.

In the Gowganda district a large vein carrying some silver values has lately been discovered on the property of the Gow-



ganda Four, and a 1-inch vein of high-grade ore has been discovered on the Sweet claims at Hangingstone Lake.

An automobile stage, running five trips a day, has been started between Cobalt and the Kerr Lake district. This will be a great advantage to the residents of both places.

Recent development below the 200-foot level of the City of Cobalt has shown that the ore which pinched out came in again. An intermediate level has been run, and from 4 to 6 inches of

high-grade ore was found. Development in the banded slate below the 137-foot level has been very encouraging. Some of the richest ore in the mine has been taken from this formation.

The Cobalt Hydraulic Co. has connected the two portions of their 1,000-foot tunnel. The connection was made at a point 375 feet from the intake end. It now remains to cut out the two benches and to complete the second intake shaft. Work will also be started on the chamber near the outlet shaft from



which the air will be drawn off. The main pipe lines are rapidly being joined up, and when these are completed the different lines to the mains will be laid.

Mr. J. W. Shaw has been appointed manager of the Cochrane mine in place of Mr. Floyd Harman, who resigned a short time ago to take care of the Harman Mining & Development properties.

A special meeting of the Cobalt Development Co. has been called for Sept. 20th. in Toronto. The purpose of the meeting is to dispose of the remainder of the treasury stock at 25 cents per share. There is also a by-law to be brought before the meeting for the reduction of the number of directors from nine to five.

The shaft on the Gould Consolidated Mines at Cart Lake has now a depth of 125 feet, and will be continued to the 150-foot level. From this point cross-cuts will be driven east and west with the object of cutting the Nipissing vein and other leads under Cart Lake.

Progress is being made in sinking the shaft of the Union Pacific mine at Peterson Lake. When the 150-foot level is reached a cross-cut will be driven to cut the big vein which dipped from the shaft 60 feet below the surface. This company also owns claims adjoining the North Cobalt mine, and on one of these a shaft will be sunk in an effort to locate the big vein recently found by the Jacobs Exploration Co. A considerable sum of money has been voted by the directors for the purpose of developing some of their other properties.

#### WESTERN ONTARIO.

**Kenora Mining Division.**—The Prospectors and Mine Owners' Association held their monthly meeting on Tuesday, Sept. 7th. The entire meeting was given over to a discussion amongst the members of section 78, sub-section 1, of the Mining Act, some of the members being inclined to think that the working conditions enforced were of too stringent a nature. They finally instructed their secretary to write to similar



Vein 7 to 8 feet, 120 feet stripped, on claim located by G. Lariviere, Kenora.

associations in other districts asking an expression of opinion on this subject.

The Laurentian gold mine is now working double shifts, and the company is getting a good showing for its work.

The Paymaster mine at Gold Rock is erecting a new stamp mill, which will be in operation at the end of January, 1910.

The Detola mine is re-commencing operations, and has started in doing development work.

A good deal of attention is being paid to the West Hawk and High Lakes district, some thirty miles west of Kenora. Several prospecting parties from Winnipeg have been operating this summer in that district, but no important strikes are as yet reported.

Negotiations are now under way concerning the reopening of the Regina mine, owned by English capitalists. The pumping out of the mine and resumption of operations there at a not far distant date is confidently expected by those having a knowledge of the affairs of that company.

From the Sturgeon Lake district comes the report of a valuable find made by G. Lariviere, of Kenora. The vein is 7 to 8 feet, and has been stripped for a distance of 500 feet, and is showing splendid values.

In connection with these Sturgeon Lake properties it may be of interest to quote from an engineer's report made on behalf of a private company:—

"The formation of the country is Laurentian, Keewatin and Post-Keewatin. The great body of country rock is gneissic granite with intrusions of schists and slates. Porphyritic granite, quartz porphyry, mica syenite, etc., are common. The schists are chlorite, olivine, sericite, serpentine and mica, the first-named being the most common. Diabase, gabbro and diorite are important rocks of the district."

I might say that the reason so little prospecting has been done in previous years has been on account of the excessive cost of transportation, 100 miles from Ignace Station, until now, when we have the G. T. P. branch from Westfort, which takes us to the south end of the lake, on which there are several boats and good facilities for getting around. The greater number of the reported rich strikes of this year are upon prospects staked last year, and have shown up good values when sinking was started, and these values in nearly every instance increased with depth, and show free gold in remarkable quantities. Other properties have shown nuggets of native silver along with the gold. Copper occurs, and zinc blende is quite noticeable.

The district is in its infancy; the small lakes adjoining Sturgeon Lake have not been looked into at all. Nothing has been done back from the water, and scarcely any systematic work done.

#### QUEBEC.

**Sherbrooke.**—Mr. G. R. E. Kennedy has sent up from the Eastern Townships the best exhibit of the mineral wealth of that section of Quebec that has ever been shown at Ottawa. It is well known that that section of the Eastern Townships is the greatest shipper of asbestos in the world. In addition to asbestos, the Kennedys exhibit some beautiful samples of gold in quartz and nuggets, some from Nova Scotia and some from Southeastern Quebec, from which region the late Hon. J. H. Pope is credited with taking more gold than the public ever heard of. The exhibit also comprises chrome, mica, phosphate, marble, slate, talc, coal, copper, silver, etc.

John McDonald has transferred his copper property in Weedon to the people to whom it has been under option, the price being \$100,000, and the first payment was made Sept. 11.

On Tuesday, the 21st of September, Messrs. C. J. McCuaig, F. W. Bailie and S. W. Ewing, of Montreal, visited the properties of the Black Lake Consolidated Asbestos Co., and those of the Amalgamated.

The issue of \$1,000,000 of 8 per cent. gold bonds, with a bonus of 25 per cent. of preferred and 50 per cent. of common stock is announced by the Black Lake Consolidated. It is intended to erect immediately two large mills for the Union and the Bell mines, and later a third for the development of other portions of the company's large acreage.



Work on the 750-ton mill for the Union is begun, the concrete foundation for the rock bin and crusher house are nearly completed, and foundation for the drier house started.

Survey has been made for the tramway from the Southwark pits, about 4,000 feet is completed, rails purchased and delivered, and by the time the mill is ready it will be supplied with its full 750 tons per day.

A company has been organized by Messrs. E. A. Dyer, Dr. McDonald, John Harris, C. P. Willey, D. L. Smith, Wm. W. Smith, and C. N. R. Tarte, N.P., to open and operate a copper property two and one-half miles from the village of Sutton. Mr. Harris will have the management of the work.

H. D. Reihle, M.E., now retained by the Black Lake Consolidated Asbestos Co., has visited nearly all the known asbestos fields of the world. In 1897 he was in Dutch East Africa, Cape Colony, etc. In 1898-1900 he spent two years in Nordland, Norway. In 1902 he went to Asiatic Russia, Siberia, Altai and Northern Mongolia. Later he went to the Aosti Valley, Italy; then he examined some deposits in Georgia, U.S.A., returning to Canada, where he has erected an efficient and up-to-date plant in the East Broughton District.

Mr. C. E. Kennedy, of Beebe Junction, is opening an asbestos property in Northern Vermont that promises to make a mine. In spite of the man on the street, boundary lines of towns, counties, provinces or countries do not cut off mineral belts, as may be shown in Pontiac County, when the blanket licenses expire.

#### BRITISH COLUMBIA.

**Rossland.**—At the Le Roi mine, which is the centre of attention in this district just now, the working force has been steadily increased to a crew of about eighty men, and in addition to the three diamond drills a few machine drills have been put to work stoping ore from a new lode that has been recently opened up. In addition to the work going on in the lower levels the 600 and 700 ft. levels are also scenes of activity. It is expected that work will be energetically extended as opportunity and development permit from this time on, and all those interested here seem to be quite sanguine of good results ensuing.

At the Centre Star group and at the Le Roi 2, Limited, the regular weekly shipments were made, running the total shipments for the week ending Sept. 4th up to 4,370 tons, which is somewhat lower than the weekly shipments have been from this district lately.

Among the smaller properties about the camp things are not as lively as they were. At the Blue Bird there has been a cessation of work owing to the company having bought out the recent lessees and having now under consideration a plan of operation. The Evening Star is now not under lease, the last lessee having got into legal difficulties. But little work is going on at the Hattie Brown, although the management states that a plan of diamond drilling is being prepared. In the case of several meritorious small mines hereabouts, however, it is not lack of applications for leases that is causing the mines to lie idle, for there are a number of men who are willing to take hold, but the mining companies feel that it will take men with plenty of money to work the mines properly and systematically, and they are waiting until such time as men with money come along, when we may expect to see these mines on the working list once more. Taking the district throughout, things are looking well. There are some very good prospects in the hills about this camp that in the next four or five years will come into their own.

**The Boundary.**—There is so much going on in B. C. Copper and New Dominion affairs these times that one wonders where and how it is going to end. Last week the district received a visit from J. Lewisohn, a director of the B. C. Copper Co. and

heavy owner in the New Dominion. J. Parke Channing, consulting engineer of the New Dominion Copper Co., accompanied Mr. Lewisohn. Together with J. E. McAllister, manager of the B. C. Copper Co., they visited the Brooklyn and Rawhide (New Dominion) mines, the Mother Lode (B. C. Copper) at Greenwood, and the Sunset and Idaho (New Dominion). J. Seward, manager of the Dominion properties, was also of the party. It is quite natural, of course, that Mr. Lewisohn and Mr. Channing should look over the New Dominion properties at a time when dawn is just breaking over another (and we trust successful) period of operations for the Dominion mines. It is also businesslike of Mr. Lewisohn to look over the property of the B. C. Copper, in which he has invested a large sum of money and of which he is an important director. This more especially when the copper producers of the Boundary are about to enter an epoch-making period of activity.

The B. C. Copper Co. is making regular shipments of about 8,000 tons of ore per week to the Greenwood smelter, and the activity of the company is felt throughout this district. The company has a crew of men doing development work on the Sappho group, near Midway, which it has recently bonded. It has applied for a water right in the Similkameen water district, this water to be used on its claims in Wellington camp. A couple of Kamloops mining men have been here during the past week working on a proposition to bond one of the Kamloops groups of claims, on which there is a splendid showing of iron ore, to the B. C. Copper Co. The officials of the B. C. Copper Co. have announced that the concern will be in a position to pay a dividend when the surplus amounts to \$200,000 or over. The big "glory hole" workings of the Copper Co. are to be worked on a larger scale than ever from now on, so much so that the company is moving the homes of several miners that were near, fearing they might be damaged by the heavy blasting. This surface mining is really what counts in low mining costs in the Boundary, and is a big aid in the production of  $8\frac{1}{2}$  blister copper.

Work is soon to be started on the Canadian Pacific Railway spur into the Phoenix Amalgamated mine of the Con. M. & S. Co. of Canada. As soon as this spur is completed this concern intends to begin shipments to Trail smelter from this point, augmenting the shipments now being made from the Snowshoe. The Consolidated Company will also ship from the No. 7 mine in Central camp as soon as the new railway spur is built into that camp. It is suggested that it may be found necessary to build a concentrator to treat the ore from the No. 7 mine.

The general manager of the Granby Con. M. S. & P. Co., Mr. A. B. W. Hodges, is on a visit to the Queen Charlotte Islands and the Portland Canal mining districts. It is Mr. Hodges' opinion that if half of what he has heard of the copper deposits of the Queen Charlotte Islands is true, then another very valuable copper field is being opened up. Mr. Hodges was accompanied by R. P. Williams, of Rossland, who, with Mr. Hodges, is one of a syndicate that controls the Contact group of copper claims at Tasso Harbour.

The Granby Company will have finished enlarging its eighth and last furnace next month, and will then be in an excellent position to take advantage of the expected rise in the price of copper. The recent improvements at Grand Forks smelter of the Granby Co. have cost over \$250,000, the converter and blowing plant having been enlarged and several wooden buildings replaced with steel structures. It is considered that under the new working conditions the Granby will be enabled to place blister copper in New York at an average figure of  $8\frac{1}{2}$  per lb. It is now eight months since the Granby Company paid a dividend, and it is thought that there must be one about due. This concern has paid five million in dividends on an issued capitalization of thirteen million. Among the large shareholders who have benefitted some by these substantial dividends are



J. J. Hill, the First National Bank of New York, American Metal, Nichols Copper, H. I. Higginson, of New York, etc. The Granby smelter is now the largest smelter in the British Empire and the third largest on this continent, and consequently is in a position to rank as one of the lowest cost producers but for one or two things, one of which is the long haul to eastern refineries and markets.

**Nelson.**—The famous Big Ledge zinc property on the Arrow Lakes has been taken on option by W. J. Greenstreet, of the Guggenheim syndicate. The Big Ledge is a prodigious showing of "blackjack" bursting from the hills above the lakes, much of which averages 40 per cent. zinc. But little development has been necessary on the property aside from that done by Dame Nature in throwing up the huge mass of zinc ore. It is said the option price was in the neighborhood of \$400,000.

The Lucky Jim mine continues to make occasional shipments of zinc blende, carrying approximately 50 per cent. zinc. To

date about 1,200 tons have been shipped by the new management. There is a large quantity of concentrating ore in the mine, and it is planned to put up a mill to treat this product. Capitalists from the middle United States have bought the Sunset-Trade Dollar-Apex group near the Lucky Jim.

The buildings recently burned at the Silver King mine, Nelson, are to be rebuilt.

Good strikes of milling ore were made during the past week at the Mother Lode and Queen mines, Sheep Creek district.

A 20-oz. nugget, valued at \$359, was picked up on Granite Creek, near Barkerville, recently.

A group of Minneapolis capitalists has acquired 800 acres of coal land in the Nicola Valley, near Merritt. This land lies just north of the property of the Nicola Valley Coal & Coke Co., and west of that of the Diamond Vale Coal Co. The tract will be mined by a close corporation. Work along modern lines is to begin in the near future.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Glace Bay.**—President McDougall, of the U. M. W., was arrested and taken by special car to Montreal on a charge of criminal libel. Particulars are not known in Glace Bay.

### ONTARIO.

**Ottawa, Sept. 22.**—Dr. Eugene Haanel, Director of Mines, states that arrangements are being made for the establishment of the first electric smelting plant in Canada in connection with the Sault Ste. Marie iron and steel industries.

The Lake Superior Co. is arranging for the construction of a number of furnaces similar to those now in successful operation in Sweden.

A second electric smelting enterprise, involving the investment of several millions is also contemplated for the treatment of iron ores on the Ottawa River at Chat's Falls, where a splendid power site has been secured by a company headed by Mr. Louis Simpson, of Ottawa.

**Toronto.**—The particulars of the sale by tender of portions of the Gillies Limit were made public on September 15th. The total proceeds of the sale amounted to \$223,054.50. This includes \$113,111 for the Provincial Mine, which was purchased by Mr. F. M. Connell, of Haileybury. In addition to the mine, twenty parcels were offered for sale by tender. Only fifteen were sold. The area sold comprises 349 acres. The Provincial Mine property takes up 30 acres of this limit.

Including former sales, this brings up the total receipts of the Government to \$329,436.40; \$94,092.68 represents the total expenditure by the Government in mining and prospecting. The net proceeds are therefore \$234,543.72.

The successful tenders are as follows:—

- A5—Geo. F. Webb, Hamilton, \$7,709.
- A8—Ben Sommer, Montreal, \$7,447.30.
- A15—A. Pierce, Montreal, \$7,600.
- A20—T. C. Simpson, Westmount, \$12,250.
- A6—George E. Martel, Renfrew, \$15,300.
- A7—A. Rex Flinn, Pittsburg, Pa., \$4,506.
- A16—William Henry Legge, Toronto, \$3,502.
- A19—A. Rex Flinn, Pittsburg, Pa., \$6,511.
- A33—A. Rex Flinn, Pittsburg, Pa., \$2,706.
- A43—A. Rex Flinn, Pittsburg, Pa., \$2,706.
- A31—Frank E. Macdonald, Toronto, \$2,250.
- A44—A. H. Jackson, Montreal, \$2,655.
- A26—A. Pierce, Montreal, \$20,600.
- A38—Bannell Sawyer, Montreal, \$5,011.
- A39—A. Pierce, Montreal, \$9,200.

In addition to the purchase price the Government receives a 10 per cent. royalty on the gross proceeds of all sales of ore.

**Port Arthur.**—Two carloads of silver ore were shipped September 20th from Port Arthur on the steamer Easton. The ore came from the West End Silver Mountain mine, and is ticketed to Butte, Mont.

### ALBERTA.

**Taki.**—On September 13th, a Slav named Mike Nichylochuk was killed by a fall of rock at the Canada West Mine.

### BRITISH COLUMBIA.

**Nelson.**—On September 8th, Mr. Byron N. White, principal owner of the famous Slocan Star mine at Sandon, announced here that work would be resumed on a large scale at the property as soon as some details are closed in winding up the celebrated extra-lateral rights case with J. M. Harris, known as Star vs. White. It is expected that another month will see active work on this property resumed.

**Princeton.**—Wolframite has been discovered on the Marion group of claims near here.

**Kootenay.**—The B. C. Copper Company has secured options on seven of the best known groups of claims in the Kamloops camp. The groups bonded are the Bonanza group, consisting of the Comstock, Commoner, Ashton Fraction, Comet, and Cisco, all of which are held by Mr. H. Beckman on option from the original locators.

The Giantess group, two claims, Giant Copper and Giant Fraction, of which W. H. Fowler and Mr. Beckman are owners. Rising Sun group, consisting of Rising Sun, 1, 2, 3, 4, 5 and Rising Sun and Daylight Fractions, owned by E. B. Drummond and W. H. Fowler.

Kimberley group of eight claims, which includes the Stemwinder, Morning Star, Windsor Fraction, Keystone Fraction, Charlotte, Occidental, and Last Chance, all of which are owned by Mr. Beckman, who has recently spent a large sum in developing the property and has succeeded in showing an enormous mass of low grade ore.

Laura group of four claims owned by Drummond and Fowler, and which may also include the Grass Roots, of which Dr. Wade is the owner, and for which negotiations have been pending in association with the other members of the Laura group.

The deal also embraces the Maxim and Esperanza groups.

By the terms of the bond work will be commenced at an early date, and shipment of ore will follow as speedily as possible, and if the B.C. company is satisfied with the result

of their operations here, a smelter will assuredly follow, under the management of that corporation.

**Revelstoke.**—The Big Bend mica property is being developed with difficulty. The trails are in bad shape and will have to be improved before substantial work can be done.

**Victoria.**—The Pacific Metals Company has just been incorporated in Victoria with a capital of \$250,000. The object of the new mining company is to take over mining prospects and undeveloped mines and work them in order to bring them to a shipping or selling basis.

W. M. Brewer, who since 1902 has been ore-buyer for the Tye Copper Company of this city, which position he resigned president, and J. L. Parker, who was for some time manager of the Brown-Alaska Company's mines at Hadley, Alaska, and who was in charge of the North Star and Brooklyn and Steward mines in the Kootenay district, is manager for the new concern.

W. M. Brewer has been engaged in mining and ore buying for the last quarter of a century, and before coming to British Columbia in 1893 spent years in the mining districts in the Black Hills of South Dakota, Arizona, Colorado and other mining centres. For the past six years he has been engaged as ore-buyer for the Tye Copper Company.

It is expected the incorporation of the Pacific Metals Company will give an impetus to the development of mining in British Columbia, for prospectors and others who have promising prospects will find the company ready to take over the development. Mr. Brewer left on the steamer *Princess May* on behalf of the new company to look up some properties in the north.

### YUKON.

**Dawson City.**—The Yukon Gold Company, in which the Guggenheims are interested, employs 1,200 men on its various works, chiefly on Bonanza and Hunker, and have seven dredges and three electric lifts engaged in saving gold as well as hydraulic apparatus. It is expected that the company will pay a big dividend this fall, when operations will cease for the winter. By then the company will have dug 78 miles of ditches, obtaining the water from the head of the Twelve Mile.

The Northern Light and Power Company, which is developing coal deposits near Forty Mile, employs 200 men. This is the company formerly controlled by Dr. Grant and A. N. Fuller, and was taken over by an English company. Mr. Thurston is the manager.

## MINING NEWS OF THE WORLD.

### GREAT BRITAIN.

The owners of the Uranium and Radium mine at Grampound Road, near St. Austell, Cornwall, announce that their pitchblende lode has been reached at a depth of forty fathoms. The lode has forced its way through an extremely hard elvan course, every inch of which had to be blasted—the elvan course being a mixture of porphyry and granite. Some men of science doubted the existence of the pitchblende below the thirty fathom level; it is now proved to be present in good strength at a further depth of 72 feet. The British Metalliferous Mines, Ltd., believe that they will be able to supply larger orders for radium than that of 7½ grammes, value £30,000, they are now engaged upon for the Radium Institute. The company is erecting a concentrating plant, so that the pitchblende will go for radium treatment in a highly condensed form.

Preparations are being made for the erection of two steel furnaces at the works of W. Gilbertson & Co.

A lockout is threatened in the iron industry in Scotland. The Employers' and the Operatives' Executive Committee recently agreed to a reduction in wages of a farthing per hour, or a shilling per week on time rates and 2½ per cent. on piece rates, to take effect on the 9th instant. The day men have acquiesced, but the piece workers have struck. The employers have issued an ultimatum to the effect that if piece workers do not return to work on Monday there will be a general lockout of associated moulder throughout Scotland on Wednesday, the 15th September.

### EUROPE.

#### Spain.

A telegram from Huelva states that as the result of the strike of the workmen of the Mora mine, a British concern, the directors have declared a lockout which affects one thousand miners.

#### Russia.

So far as concerns production, the position of the Russian oil industry is a little more favourable than was the case a short time ago, and it is probable that an expansion will be shown in the output for the current year as the result of the increasing number of wells which are steadily coming into operation. An

analysis of the output of each individual source of supply shows, however, that the production per well is not improving. As regards prices, the current quotation at Baku is a little under 23 copecks per pood, which while higher than the corresponding quotation in 1907-8, is not so good as the figure ruling some six months ago. There does not seem to be much prospect of a recovery in prices just at present, though it is equally true that the market seems firm at the present level. Expenses have undoubtedly gone up very substantially of late, partly as a result of increased wages, while the much greater depths to which the wells have been sunk adds to the cost of raising the mineral. It is also a fact that a great deal of unproductive work has been carried out, a considerable number of the borings recently instituted having given no tangible results. As it costs at least £10,000 to sink a well, it is obviously a serious matter when such a heavy expenditure proves abortive.

#### Italy.

Salt is being experimented with by the Italian Department of Agriculture as a preventive of ankylostomiasis. The Formignano colliery was chosen as the place for the experiments. Here salt was strewn about the workings. Results so far are negative.

#### Roumania.

Eighteen petroleum testing holes at Moreni, the richest spot in the Prahova petroleum district, have been burnt out. The loss is estimated at about £40,000, of which half represents American capital. No loss of life is reported.

#### Austria.

The year 1908 was an eventful one in the Galician oil industry, being marked by greatly increased production and such unprecedentedly low prices that many of the producers were threatened with ruin. The Austrian Government finally came to the rescue with active assistance, which has helped towards putting the industry on a sound basis. By the end of 1907 the price of crude oil had fallen to 1s 3d per 100 kilograms. During the first three months of 1908 there was a slight rise in prices, but in April and May a number of new wells were struck, and the enormous overproduction which followed caused the greatest embarrassment to the industry, while the existing storage and railway transport arrangements proved totally inadequate.



In view of the critical condition of the industry, the Austrian Railway Minister visited the oil district and promised to introduce the use of oil instead of coal on the state railways in Galicia; he also arranged for improved transport facilities. A provincial association of oil producers, representing 80 per cent. of the total production, was formed, and this body made a contract with the state railways for the delivery of 220,000 metric tons of oil per annum. The railway authorities, however, found that it was not safe to use the oil in its crude state in railway locomotives, but that the benzine would have to be extracted first. The Producers' Association had not the capital to build the necessary works for this process or the new reservoirs required. Accordingly the Government undertook to build a factory extracting the benzine at Drohobycz, and to lease it to a cartel of the Austrian refineries which is being formed, and which will undertake to purify the oil for the use of the state railways. The state will pay the Producers' Association direct for the raw oil required at a price considerably higher than the present market price, and which has been fixed with reference to the cost of the coal that would have been required for the locomotives. The state will further build the reservoirs and lease them to the oil miners at a rate just sufficient to cover the interest and amortisation of the capital.

The Government has introduced a bill in the Reichsrath by which a concession will in future be necessary for carrying on the business of storing, handling, and refining raw oil in Austria, and the provincial authorities will be empowered to refuse this concession at their discretion.

In 1908 the amount of crude oil produced in Galicia was 1,734,235 metric tons, as compared with 1,175,974 tons in 1907 and 760,443 tons in 1906. 15,906 metric tons of mineral oils were imported into Austria-Hungary in 1908, as compared with 18,816 tons in 1907 and 27,399 tons in 1906; and 370,600 tons were exported in 1908, as compared with 217,258 and 195,885 tons respectively in 1907 and 1906. The export of mineral oils from the monarchy, chiefly in the shape of refined petroleum or benzine, has risen enormously during the last few years, having increased proportionately more rapidly than the total production, of which it now forms about the fifth part. Nearly two-thirds of the export are sent to Germany; then follow France, Switzerland, Turkey, Italy and the United Kingdom, the last-named country only taking 4,500 tons.

#### NEW ZEALAND.

The Consolidated Goldfields of New Zealand in 1908 distributed dividends to the amount of £12,119, as against £18,178 in 1907. Progress Mine paid no dividend; but the Wealth of Nations Mine gave a higher yield than usual, the working profit being £14,500, or 21s 5d per ton.

#### UNITED STATES.

The improvement in the spelter market is being reflected in the zinc-producing districts of Colorado. This is especially noticeable at Leadville.

The U. S. Assay Office, Butte, Montana, reported receipts of \$240,982 of gold during August. These receipts are unusually large.

The Goldfield Consolidated mill will probably be enlarged to a capacity of 1,000 tons per day. Its present capacity is 600 tons. Treatment costs are now less than \$2 per ton of ore.

The railroads are granting reduced rates to delegates to the American Mining Congress to be held at Goldfield.

It is estimated that the output of the Goldfield Consolidated, Goldfield, Nevada, for August stands at \$602,000. The ore tonnage was 22,160 tons. The estimated total cost of production was \$155,000, leaving a net profit of \$447,000.

The asbestos deposits near Casper, Wyoming, are being actively exploited. Two mills are to be erected in the near future.

#### MEXICO.

A number of mining companies have suffered directly and indirectly from the flood in the Monterey district. Although most of the mines are on high ground, their loss has been great through the destruction of transportation lines.

The tonnage of ore treated at the El Oro plant in August was 24,183 tons. Total yield was \$215,120, and net profits \$78,300.

#### SOUTH AFRICA.

Johannesburg.—A modified form of gelatine for blasting purposes has been produced at the Moddersfontein Explosives factory, and will, it is stated, enable two additional holes per shift to be drilled, requiring less labour for equivalent results, or enabling quicker and more economical development.

Mine Inspector Swinburne has recently made a highly valuable and instructive report upon the northern tin fields. The developments on the properties being worked by the Transvaal Consolidated, Lands, Rooiberg Development Company, and others practically assure a permanent industry.

The aggregate profits of the Witwatersrand mines for July amounted to £1,027,374. The month's development work gives a measurement equivalent to 15½ miles and marks another record.

The entire control of the Bantjes Consolidated is passing into the hands of Messrs. Eckstein & Co., their representative having been appointed chairman and the offices of the company transferred.

The new scheme for the amalgamation of the Nigel Deep with the Sub-Nigel is favourably criticised.

The Apex Mine and Benoni Consolidated have come to an agreement for the erection of a joint mill, capable of crushing 60,000 tons of ore per month, to be located on the former company's property. The developments on the Benoni property will ensure the supply of 20,000 tons per month to the first section of the mill as soon as erected.

The boring operations upon the Roberts-Randfontein property have resulted in striking a banket series at a depth of 1,950 feet.

In the Transvaal Government stope drill competition the Siskol drill has established a new record by accomplishing 132 feet in one shift.

Johannesburg.—At the annual meeting of the New Modderfontein Gold Mining Company, Mr. Sammel Evans, the acting chairman, stated that they anticipated that with the enlarged plant now working the costs for the current year would be substantially reduced. He forecasted a vigorous development policy, and stated that when the ore reserves had been sufficiently increased there would be such an enlargement of plant as would enable the present generation of shareholders to derive the maximum benefit from their extensive claim area. The recent development in their own property and in the Brakpan mine had proved the value of their deep-level ground. For the moment the rate of progress depended upon the supply of unskilled labour. It was impossible to forecast the condition of the South African labour market from month to month, but past experience justified them in concluding that in time they would get all the labour they wanted. Mr. Evans added that they were in the midst of an industrial revolution, the far-reaching effect of which on shareholders' dividends and on South African prosperity would only be fully appreciated in a few years' time. He pointed out that the largest companies crushed monthly per white employee an average of 95 tons, as against 85 for the smallest companies. Similarly the coloured labour of the large companies crushed 14 tons, as against 8 tons of the smallest companies. The number of coloured employees to one white employee was in the large companies 6.1 and in the small companies 10, thereby showing that the growth of the large concerns increased the proportion of Europeans employed, as compared with coloured labour, and improved the productivity of both classes of labour.

## COMPANY NOTES.

Following is the report of the Le Roi No. Two, Limited, for the Josie mine for the month of July, as issued by F. A. Labouchere, from the London office of the company.

Output.—Approximately 2,000 tons were shipped during July.

Development Work.—Development work was carried on in the Josie shaft, 400-foot level, 500-foot level, and intermediate level, between 500 and 700 (703 drift).

Josie Shaft.—The Josie shaft was sunk a distance of 97.5 feet during the month. Favourable ground was met with, which drilled and broke readily. We shall not make such good speed during August on account of the station cutting, which will be necessary at the 1,000-foot level. (The following cable has since been received: "Josie shaft, 1,000-foot level station, nearly completed.")

400-foot Level, 401 Drift.—This was driven eastward a distance of 41.1 feet until it met with the Josie dyke. As there is still ore in the hanging wall, this was slabbled off for about the same distance. The average assay from drift and slab work was .71 ozs. gold and 4.0 per cent. copper, but the ore, though very good, is too scattered to be given a definite width as yet. Twenty samples were taken.

402 Drift.—This was driven westward a distance of 34.9 feet, and met with a little scattered ore, which assayed .68 ozs. gold and 1.2 per cent. copper. Eight samples were taken.

500-foot Level, 501 Drift.—This drift was advanced a total distance of 3.75 feet during the month. Some stoping was also done. Nineteen samples of the scattered ore taken in drift and stope averaged .56 ozs. gold and 3.8 per cent. copper. Both here and in 401 stope the width of the ore body should show up more definitely during August.

703 Intermediate Drift.—This was advanced a distance of 79.5 feet and towards the end got poorer. The average assay was .87 ozs. gold and 1.2 per cent. copper over a width of 17 inches. Eighteen samples were taken.

Poorman Stope.—The ore from here is practically all second-class.

303 Stope, 300.—We shall probably discontinue drawing ore from here temporarily during August, since the ore now showing in the back of 32 stope is not so good. A pillar of ground will be left in for the present so that track will not be disturbed.

301 Stope.—More ore will be drawn from here during August than during July.

401 Stope.—This stope is showing up very well, and during the next five months should become an important ore producer.

423 Stope.—Three samples across the full width of the stope were taken here, and the average assay was .66 ozs. gold and 2.32 per cent. copper, over an average width of 2 feet. Lately the ore has begun to extend eastward, and in all this month's work has added about 53 feet to the stope.

32 Stope.—The ore in this stope is now getting a little poorer in the back the average of 40 samples taken during the month showing .68 ozs. gold and 2.1 per cent. copper over a width of 15 inches.

501 Stope.—This stope is referred to under the head of 501 drift. The ore here is gradually beginning to assume more definite shape.

702 Stope.—Good ore is being broken here, the average for the month being 1.86 ozs. gold and 5.3 per cent. copper over an average width of 1 foot 11 inches. Twenty samples were taken.

703 Stope.—The drift is being taken down here and stoping operations started. When this is timbered up, the drift will be pushed westward as long as it is in pay ore.

Announcement is made that the annual general meeting of the City of Cobalt Mining Company will be held on Friday, October 8th, at 3 p.m., in Cobalt. The report of the directors will be received and other business transacted.

The Buffalo Mines declared its regular quarterly dividend of 5 per cent., payable October 10th, to stockholders of record September 20th, and an extra dividend of 3 per cent., payable to stockholders of record November 5th.

### WORK ON THE LE ROI.

A despatch from British Columbia states that the managing director of the Le Roi, having returned to the mine, says that the directors having made the necessary financial arrangements, will enable him to undertake immediately the large and comprehensive scheme of exploration work approved during his stay in London. It is intended to sink the main shaft a few hundred feet further and to do a large amount of diamond drilling, so that the mine can be thoroughly prospected to a depth of about 1,000 feet below the present 1,650-foot level.

The directors of La Rose Mining Company on Sept. 20th. declared the regular quarterly dividend of 3 per cent., with 1 per cent. bonus.

The Herald has it on good authority that the next quarterly dividend will be on a higher basis.

While the Lawson property and other mines in the La Rose combination have been making wonderful showings, the development of the new properties has required the expenditure of a good deal of money, all of which has come out of the La Rose treasury. The La Rose, however, can at any time now increase its output materially.

At the meeting of Nipissing directors held on Sept. 20th. it was decided to raise the dividend from 20 per cent. to 30 per cent. per annum. The regular quarterly dividend was raised to 5 per cent, and, in addition, the bonus was made 2½ per cent.

By the time the Nipissing dividend is payable on October 20th next, the company claims that it will have a surplus of approximately \$1,300,000, of which \$800,000 will be in cash and the balance in ore in transit or at the smelter.



# STATISTICS AND RETURNS.

## COBALT ORE SHIPMENTS.

There were only six shippers among the Cobalt mines last week, with the bulk of the tonnage from the Nipissing and La Rose. Shipments for the week aggregated 871,750 lbs. of ore, or 435.87 tons.

Shipments of ore in pounds for week and year to date were:—

|                        | Week ending<br>Sept. 11. | Year.     |
|------------------------|--------------------------|-----------|
| Chambers-Ferland ..... |                          | 961,010   |
| City of Cobalt .....   |                          | 1,042,522 |
| Cobalt Central .....   | 41,360                   | 600,204   |
| Cobalt Lake .....      |                          | 79,960    |
| Coniagas .....         |                          | 1,216,895 |
| Crown Reserve .....    | 189,630                  | 4,433,079 |
| Drummond .....         |                          | 920,000   |
| Kerr Lake .....        |                          | 1,482,156 |
| King Edward .....      |                          | 180,740   |
| La Rose .....          | 273,700                  | 9,038,433 |
| McKinley .....         | 42,810                   | 1,431,106 |
| Nipissing .....        | 259,800                  | 9,560,043 |
| Nancy Helen .....      |                          | 83,400    |
| Nova Scotia .....      |                          | 480,810   |
| O'Brien .....          | 64,500                   | 1,895,502 |
| Peterson Lake .....    |                          | 324,040   |
| Right of Way .....     |                          | 2,134,891 |
| Silver Queen .....     |                          | 598,395   |
| Silver Cliff .....     |                          | 123,820   |
| Temiskaming .....      |                          | 2,046,060 |
| Trethewey .....        |                          | 1,362,698 |
| T. & H. B. ....        |                          | 1,106,260 |
| Muggley Cons. ....     |                          | 72,900    |

## COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending Sept. 18, and those from Jan. 1, 1909, to date:—

|                        | Sept. 18.<br>Ore in lbs. | Since Jan. 1.<br>Ore in lbs. |
|------------------------|--------------------------|------------------------------|
| Buffalo .....          |                          | 832,668                      |
| Carnegie .....         |                          | 63,410                       |
| Chambers-Ferland ..... |                          | 961,010                      |
| City of Cobalt .....   |                          | 1,042,522                    |
| Cobalt Central .....   |                          | 600,144                      |
| Cobalt Lake .....      |                          | 79,960                       |
| Coniagas .....         |                          | 1,153,485                    |
| Crown Reserve .....    | 63,000                   | 4,496,079                    |
| Drummond .....         | 72,100                   | 992,100                      |
| Kerr Lake .....        | 160,050                  | 1,642,206                    |
| King Edward .....      |                          | 183,740                      |
| La Rose .....          | 130,000                  | 9,168,433                    |
| McKinley-Darragh ..... |                          | 1,426,108                    |
| Nipissing .....        | 252,310                  | 9,803,353                    |
| Nova Scotia .....      |                          | 480,810                      |
| Nancy Helen .....      |                          | 83,400                       |
| Peterson Lake .....    |                          | 324,040                      |
| O'Brien .....          | 63,960                   | 1,959,512                    |
| Right of Way .....     |                          | 2,154,891                    |
| Silver Queen .....     |                          | 598,395                      |
| Silver Cliff .....     |                          | 123,820                      |
| Temiskaming .....      | 60,000                   | 1,566,060                    |
| Trethewey .....        | 123,000                  | 1,485,698                    |
| T. & H. B. ....        |                          | 1,106,260                    |
| Muggley Cons. ....     |                          | 72,900                       |

Ore shipments to Sept. 18 from Jan. 1 are 42,401,022 pounds, or 21,200 tons.

Total shipments for week ending Sept. 18 are 924,420 pounds, or 462 tons.

The total shipments for 1908 were 25,463 tons, valued at \$10,000,000.

During the first seven months of 1909 the exports of anthracite coal from the United States amounted to 1,709,401 long tons, and of bituminous coal 4,915,914 long tons. Of these amounts Canada took 1,685,395 tons of anthracite, and 3,424,795 tons of bituminous. This amounts roughly to 77 per cent. of the total U. S. exports. In the same period Canada sent 543,198 tons of coal to the United States, and about 70,000 tons of coke, chiefly from the West.

## KASLO SILVER, LEAD AND ZINC ORES.

The ore shipments through Kaslo over the K. & S. for the month of August were the largest known for any single month for some years past. The output was 100 cars, compiling a total of 2,222 tons. Of this amount zinc ore formed the bulk with 1,710 tons and 482 tons of silver-lead. The latter was consigned to Trail, and the former to four zinc smelters in various parts of the United States. The largest shipper was the Whitewater with a total combined output of 1,010 of both classes of ores, zinc predominating, and the Lucky Jim a close second with 990 tons of zinc only. Although mining as a whole appears quiet, the output so far for 1909 is the largest for a number of years past, the total for the district to date being 13,597 tons of all kinds of ores, and from this is omitted the past month's output from the Bluebell, which would swell the August output at least 500 tons more. At the present rate of shipments the output for the year will easily touch or go over the 25,000 mark, which will establish a latter day record.

The following is the list of mines and their tonnage for August:—

| Silver-Lead.          |  |       |
|-----------------------|--|-------|
| Mine.                 |  | Tons. |
| Rambler .....         |  | 120   |
| Cork .....            |  | 82    |
| Whitewater .....      |  | 60    |
| Whitewater Deep ..... |  | 200   |
| Wellington .....      |  | 20    |
|                       |  | 482   |
| Zinc.                 |  |       |
| Lucky Jim .....       |  | 990   |
| Whitewater Deep ..... |  | 750   |
|                       |  | 1,740 |

Total output to date of silver-lead and zinc ores, 12,597 tons.

Nelson, Sept. 11.—Some 80 men are now at work in the Le Roi mine at Rossland, and it is expected that shipments will be recommenced shortly. The output of the district for the past week has been about the average for the year so far. Appended are the details:—

## ORE SHIPMENTS.

| Boundary—             | Week.  | Year.   |
|-----------------------|--------|---------|
| Granby . . . . .      | 19,027 | 681,900 |
| Snowshoe . . . . .    | 4,313  | 95,929  |
| Mother Lode . . . . . | 6,336  | 176,684 |
| Other mines . . . . . |        | 2,112   |

|                                |        |         |
|--------------------------------|--------|---------|
| Total . . . . .                | 29,676 | 956,625 |
| Rossland—                      | Week.  | Year.   |
| Centre Star . . . . .          | 3,377  | 122,044 |
| Le Roi No. 2 . . . . .         | 629    | 22,022  |
| Le Roi No. 2, milled . . . . . | 260    | 9,200   |
| Other mines . . . . .          |        | 9,561   |

|                                   |       |         |
|-----------------------------------|-------|---------|
| Total . . . . .                   | 4,266 | 162,827 |
| Slocan-Kootenay—                  | Week. | Year.   |
| Queen, milled . . . . .           | 420   | 14,910  |
| Granite-Poorman, milled . . . . . | 250   | 8,850   |
| Whitewater Deep, milled . . . . . | 700   | 25,000  |
| Kootenay Belle, milled . . . . .  | 70    | 2,490   |
| Second Relief, milled . . . . .   | 145   | 5,150   |
| Nugget, milled . . . . .          | 110   | 3,910   |
| Bluebell, milled . . . . .        | 900   | 32,000  |
| St. Eugene . . . . .              | 314   | 14,949  |
| Enterprise . . . . .              | 8     | 8       |
| Ferguson . . . . .                | 33    | 131     |
| Belcher . . . . .                 | 23    | 58      |
| North Star . . . . .              | 44    | 1,379   |
| Ottawa . . . . .                  | 63    | 168     |
| Rambler-Cariboo . . . . .         | 59    | 680     |
| Cork . . . . .                    | 21    | 277     |
| Emerald . . . . .                 | 77    | 1,022   |
| Bluebell . . . . .                | 133   | 3,584   |
| Yankee Girl . . . . .             | 105   | 1,694   |
| Whitewater . . . . .              | 87    | 907     |
| Queen . . . . .                   | 29    | 468     |
| Other mines . . . . .             |       | 14,636  |
| Total . . . . .                   | 3,591 | 132,271 |

## SMELTER RECEIPTS.

|                          |        |           |
|--------------------------|--------|-----------|
| Granby . . . . .         | 19,027 | 682,350   |
| Consolidated . . . . .   | 9,315  | 277,748   |
| B. C. Copper Co. . . . . | 6,336  | 178,167   |
| Le Roi . . . . .         |        | 12,761    |
| Total . . . . .          | 34,678 | 1,151,026 |

The London circular of Pixley & Abell, dated Sept. 2, gives the total exports of silver from London to the far east from Jan. 1 to Sept. 1 as follows:—

|                      | 1909.      | 1908.      | Dec.       |
|----------------------|------------|------------|------------|
| To India . . . . .   | £4,305,700 | £6,448,433 | £2,142,733 |
| To China . . . . .   | 1,555,200  | 516,400    | *1,038,800 |
| To Straits . . . . . | 82,800     | 90,510     | 7,710      |
| Total . . . . .      | £5,943,700 | £7,055,343 | £1,111,643 |

\*Increase.

## TORONTO MARKETS.

## Metals.

Sept. 24.—(Quotations from Canada Metal Co., Toronto.)  
 Spelter, 5¼ to 6 cents per lb.  
 Lead, 3.50 to 3.60 cents per lb.  
 Antimony, 8 to 9 cents per lb.  
 Tin, 32 cents per lb.  
 Copper, casting, 13¾ cents per lb.  
 Electrolytic, 13.75 cents per lb.

Ingot brass, 9 to 12 cents per lb.

Sept. 24.—Pig iron.—(Quotations from Drummond, McCall Co.)

Summerlee, No. 1, \$22.50 (f.o.b. Toronto).

Summerlee, No. 2, \$22.00 (f.o.b. Toronto).

Midland, No. 1, \$21.00 (f.o.b. Toronto).

Coal—Anthracite, \$5.50 to \$6.75.

Bituminous, \$3.50 to \$4.50 for 1¼-inch lump.

## Coke.

Connellsville coke (f.o.b. ovens):—

Furnace coke, prompt, \$2.50 to \$2.75 per ton.

Foundry coke, prompt, \$2.75 per ton.

Tin (Straits), 30.35 cents.

Copper, prime Lake, 13.00 cents.

Electrolytic copper, 12.85 to 12.95 cents.

Copper wire, 14.50 cents.

Lead, 4.37½ to 4.40 cents.

Spelter, 5.75 to 5.80 cents.

Sheet zinc, 8.00 cents.

Antimony, Cookson's, 8.50 cents.

Aluminium, 23.00 to 24.00 cents.

Nickel, 40.00 to 47.00 cents.

Platinum, \$25.50 to \$29.25 per oz.

Bismuth, \$1.75 per lb.

Quicksilver, \$43.50 to \$44.00 per 75-lb. flask.

## SILVER PRICES.

|                       | New York.<br>Cents. | London.<br>Pence. |
|-----------------------|---------------------|-------------------|
| September 4 . . . . . | 51½                 | 23 13-16          |
| " 6 . . . . .         | —                   | 23 13-16          |
| " 7 . . . . .         | 51½                 | 23¾               |
| " 8 . . . . .         | 51¾                 | 23 11-16          |
| " 9 . . . . .         | 51½                 | 23¾               |
| " 10 . . . . .        | 51¾                 | 23 13-16          |
| " 11 . . . . .        | 51½                 | 23¾               |
| " 13 . . . . .        | 51¾                 | 23 11-16          |
| " 14 . . . . .        | 51½                 | 23¾               |
| " 15 . . . . .        | 51¾                 | 23 13-16          |
| " 16 . . . . .        | 51½                 | 23¾               |
| " 17 . . . . .        | 51½                 | 23¾               |
| " 18 . . . . .        | 51½                 | 23¾               |
| " 20 . . . . .        | 51½                 | 23¾               |
| " 21 . . . . .        | 51½                 | 23¾               |
| " 22 . . . . .        | 51¼                 | 23 11-16          |

## MARKET NOTES.

Ferromanganese is a desired commodity. Deliveries for next year are going up in price. Pittsburg prices stand at about \$43.45 per ton f.o.b. Pittsburg, for prompt, and \$45.45 for future delivery. During the fiscal year 1907, 94,543 tons of ferromanganese were imported into the United States. The corresponding figure for 1908 was 58,101 tons, and for 1909, 64,107 tons.

Silver.—Messrs. Pixley and Abell report on September 10th a moderate inquiry for silver from the Indian bazaars on September 9th. The market closed steady. Fluctuations of the market in the near future will likely be small.

The amount of silver consigned to Bombay by this week's (Sept. 10th) steamer is about £150,000. A shipment of £22,500 was made from San Francisco to the Far East.

M. Cochery, the French Minister of Finance, has appointed a committee to study the advisability of introducing aluminium fractional coinage to take the place of copper and nickel coins. The movement was brought about by the fact that in the last 55 years copper coins to the nominal value of £900,000 have been lost out of a total coinage of £2,900,000. Aluminium has many advantages. It is light, does not tarnish, and cannot cause poisoning.



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Since the issue of the earlier volumes, many important discoveries have been made and radical departures introduced in established processes. Volume III, for example, has complete discussions of fine grinders, particularly the tube mill and grinding pans, rectilinear tables of the Wilfley type, the questions of magnetic separation, electrostatic separation, the flotation processes, and other subjects of like importance not covered in the earlier volume.

When Volume I was issued, the tube mill, which has almost revolutionized gold and silver milling practice, was

hardly touched upon. The Wilfley table was just finding its place among mills, and a number of other tables of the same type have been developed since.

Volume IV describes in detail some 94 complete mills, showing the most approved modern and successful methods of applying ore-dressing principles in use to-day throughout the mining districts of the world. Comparisons are made with earlier descriptions to show modifications and improvements, and to point out errors in older plants.

Throughout both volumes, much space and great care have been devoted to the general subjects of costs of operation, speed, capacity, water power, life of machines, etc. Power and water plants are described in connection with nearly every mill.

Complete Bibliographies are added. The Index for the entire four volumes has been remade and will be bound separately. It will be furnished without charge to purchasers of Volumes III and IV.

Book Dept. Canadian Mining Journal - Toronto



# PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

## ENGINEERS, METALLURGISTS AND GEOLOGISTS

|                                                                                                                                                                  |                                                                                                                                                |                                                                                                   |                                                                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>Dominion of Canada</b><br><b>Ontario</b><br>Campbell & Deyell<br>DeMorest, Stull & Low<br>Evans, J. W.<br>Gwillim, J. C.<br>Gillespie, G. H.<br>Hassan, A. A. | Hore, R. E.<br>Hille, F.<br>Leckie, J. E.<br>Loring, F. C.<br>Ramsay, J. D.<br>Roland, W.<br>Scott, O. N.<br>Tyrrell, J. B.<br>Willmott, A. B. | <b>Quebec</b><br>Hardiman, J. E.<br>Hersey, Milton L.<br><br><b>Nova Scotia</b><br>Brown E. Percy | <b>British Columbia</b><br>Bryant, C. M., & Co.<br>Fowler, S. S.<br>Haggen, Edward A.<br><br><b>FOREIGN—New York</b><br>Hassan, A. A. |
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## ASSAYERS, CHEMISTS AND ORE TESTERS

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|-----------------------------------------------|---------------------------------------------------|-------------------------------------------|--|

## ENGINEERS, METALLURGISTS AND GEOLOGISTS

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*When answering Advertisements please mention THE CANADIAN MINING JOURNAL.*



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### OFFICES

**Manning Arcade, Toronto**  
**Fernie, British Columbia**

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Annual Capacity of Mines, 2,000,000 tons. Coke Ovens, 600,000 tons.

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We are shipping steam coal from Winnipeg to the Pacific Coast, and not only is it used in that vast area by the Railways and the largest firms, but also by the Great Northern Steamship Company's liners plying between Seattle and the Orient.

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# The Canadian Miner's Buying Directory

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Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch if requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertisement kindly mention this Journal.

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Mussens, Ltd.
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Drummond, McCall & Co.
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Mussens, Ltd.
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The Waterous Engine Works Co.  
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Mussens, Ltd.
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Canadian Rand Co., Ltd.
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Hamilton Powder Co.  
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Curtis & Harvey  
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Waterous Engine Works.  
Mussens, Ltd.
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Drummond, McCall & Co.
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Jeffrey Mfg. Co.  
Mussens, Ltd.
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Jenckes Machine Co., Ltd.  
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Oumberland Railway & Coal Co.  
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Mussens, Ltd.
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Mussens, Ltd.
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Orford Copper Co.
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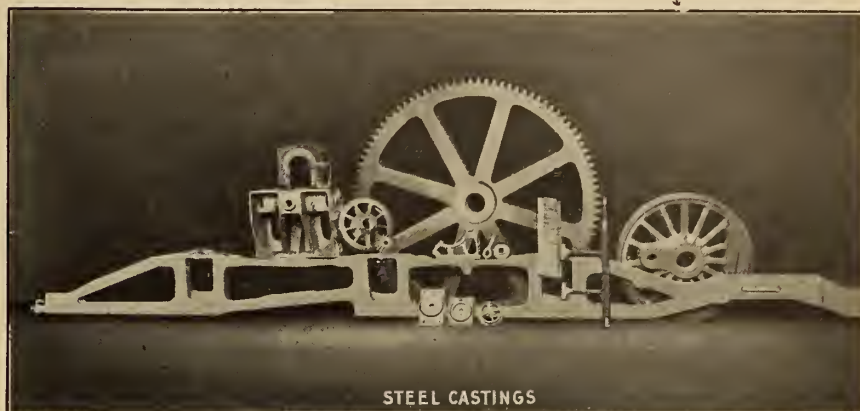
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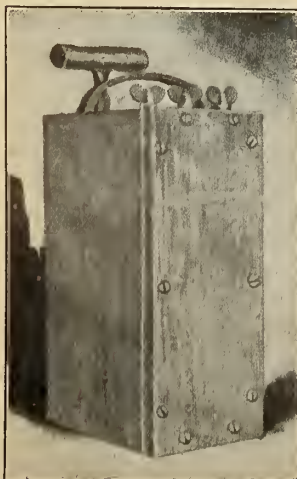
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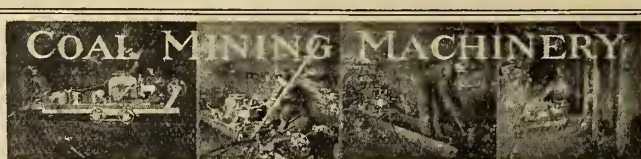
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General Catalogue, X 81

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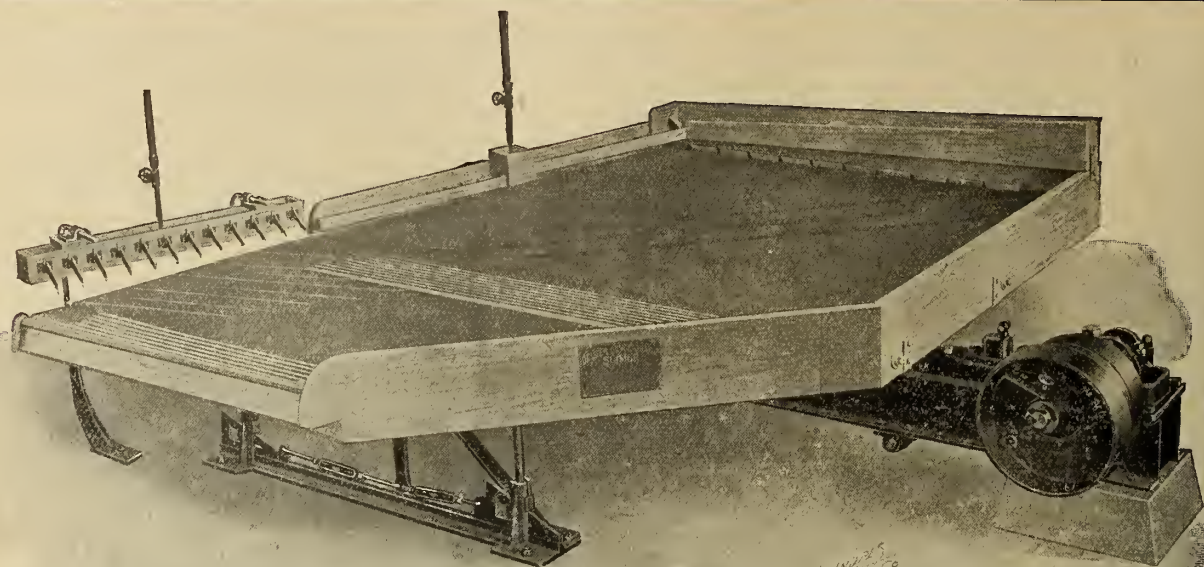
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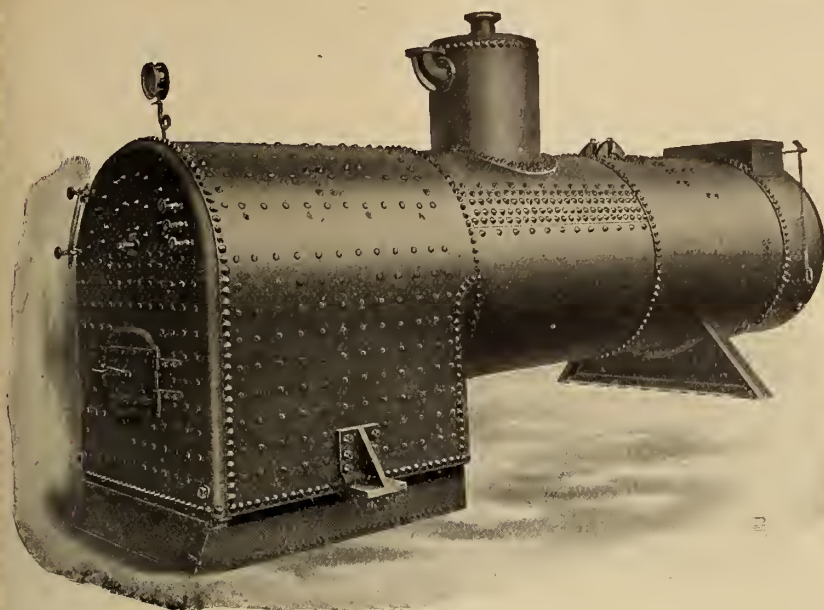
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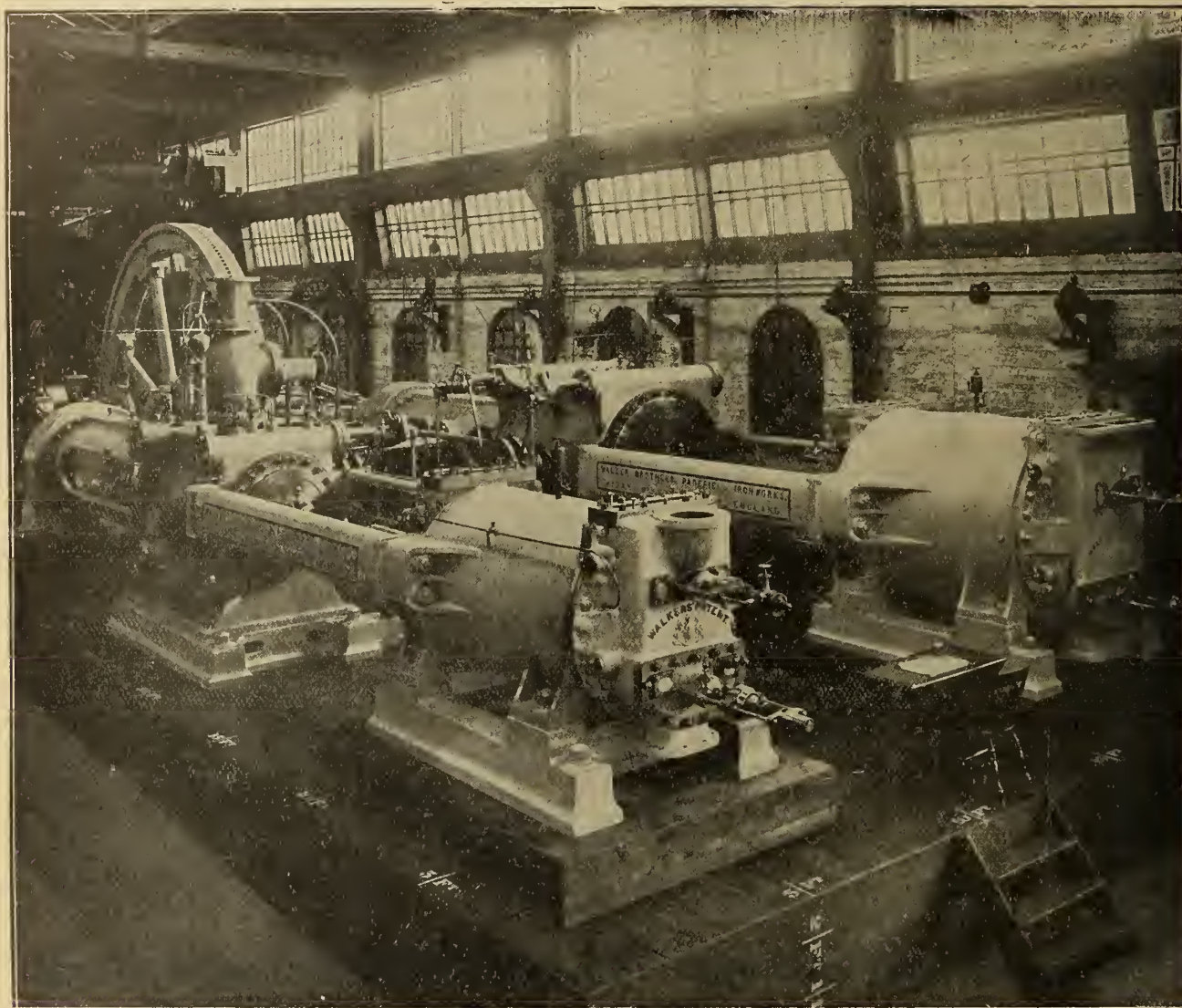
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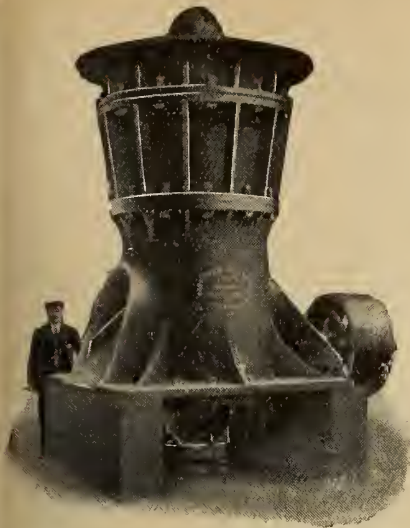
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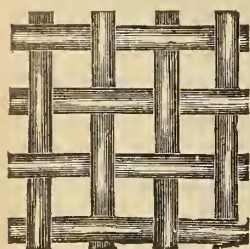
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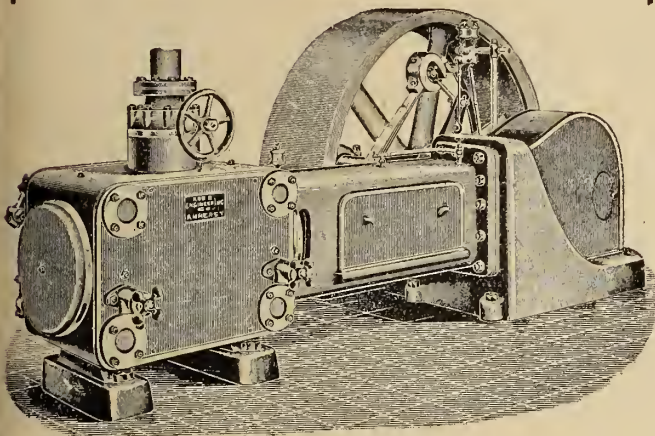
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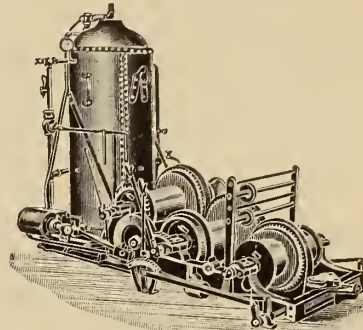
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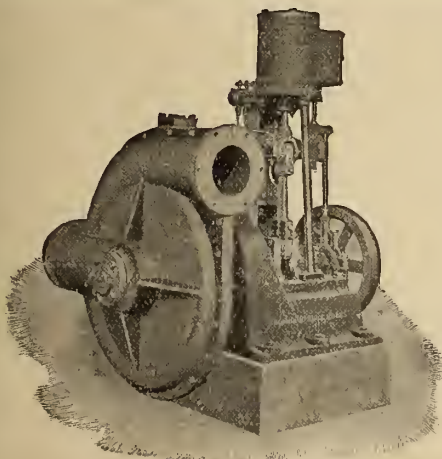
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Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

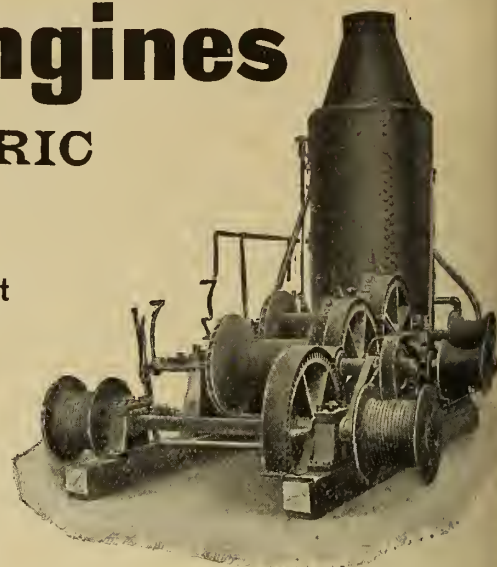
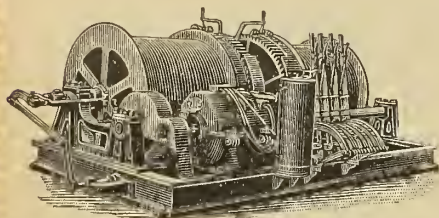
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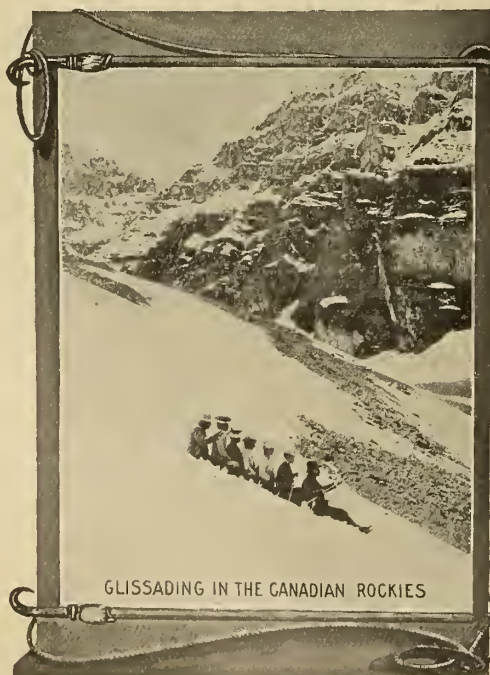
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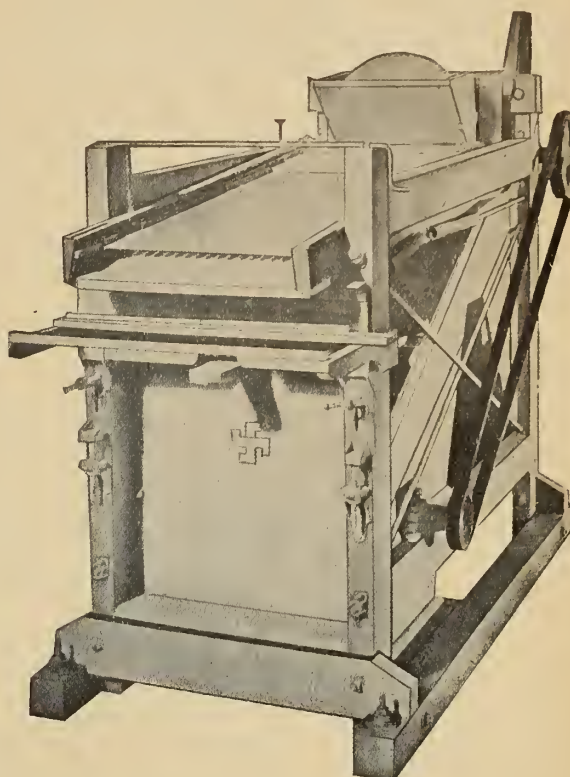
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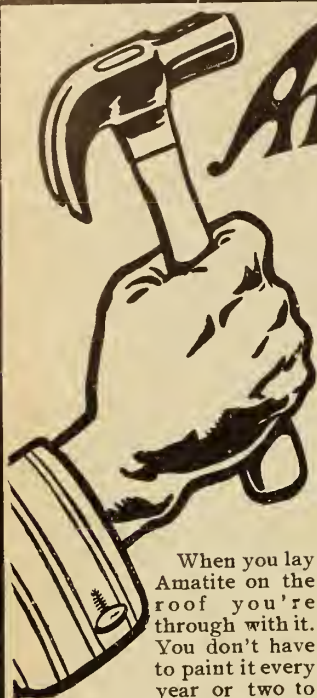
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All you need  
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you'll never  
need a  
paint brush

lay it right over the old roofing. It will cost you less than the continued maintenance of the old roof.

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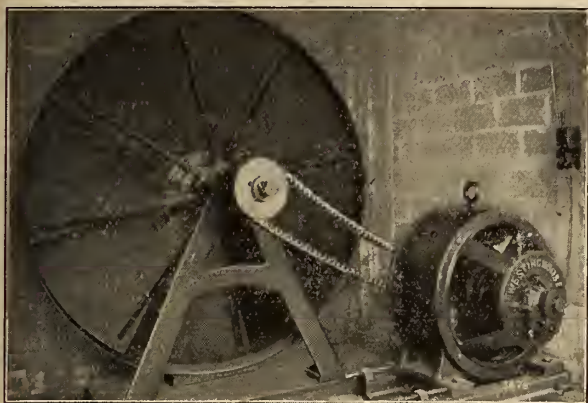


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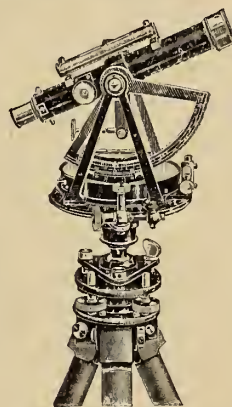
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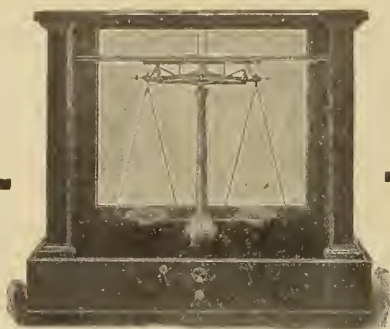
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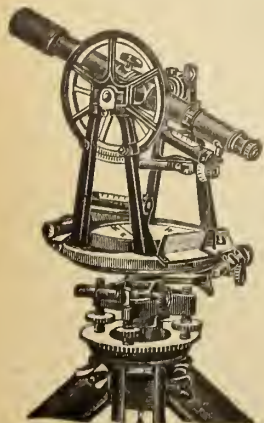


## CANADIAN MINING INSTITUTE

### NOTICE OF CHANGE OF ADDRESS.

The Secretary's Office and Library of the Institute have been removed to rooms 3 & 4, Windsor Hotel, Montreal, Que. Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.  
Office hours: 9.30 a. m., to 1.30 p. m. and 2.30 p. m. to 6.00 p. m.

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Strength up to standard specification and permanent.

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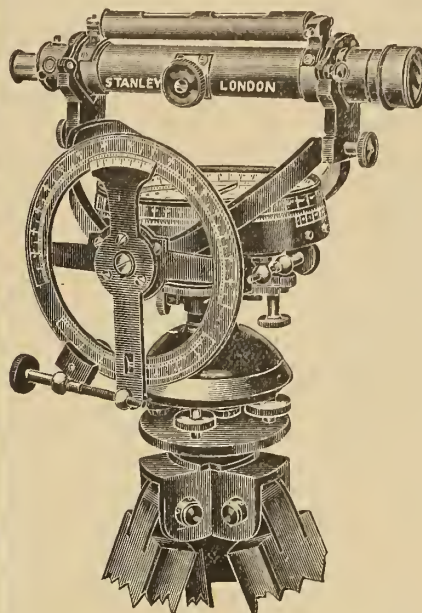
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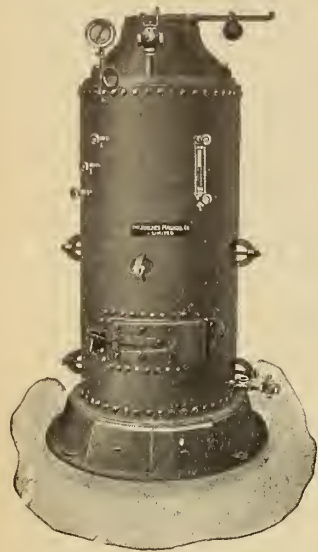
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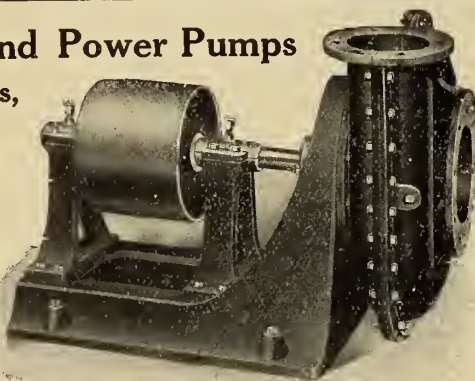
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# THE CANADIAN MINING JOURNAL

Vol. XXX.

TORONTO, October 15, 1909

No. 20

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

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### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

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### HUGH FLETCHER.

It is with deep sorrow that we record the death of Hugh Fletcher. To the mining fraternity of Nova Scotia his death is a particularly hard blow. There, in our easternmost province, he was known, respected, and by many persons of all classes regarded with affection. At Ottawa the loss will be felt no less severely.

Hugh Fletcher's father, himself a mining engineer of high character, brought him to this country over fifty years ago. Young Fletcher received his early education in Ontario. Later he became a gold medallist at Toronto University. In 1872 he joined the staff of the Geological Survey of Canada. Since that time Fletcher devoted practically all of his field work to examining the coal fields of Nova Scotia. Upon his carefully wrought-out conclusions has been based much of the commercial development of Nova Scotian coal. While it is not practicable now to sum up his work, it is entirely within bounds to assert that Hugh Fletcher left a strong impress upon the history of Maritime coal mining.

It is characteristic of Fletcher that no inducement could tempt him from his chosen path of duty. In season and out of season he stuck to his task. While his labours, translated into terms of money, put many thousands of dollars to the credit of the coal industry, he himself was satisfied with the meagre stipend that Ottawa bestows on genius and mediocrity alike.

Totally unexpected as Fletcher's death was, there is something peculiarly fitting in the circumstances in which it occurred. He died in harness, in the country where he had laboured, and he was buried in the quiet country churchyard of Springfield, Nova Scotia, where lies the body of his wife. Fletcher's grave is shadowed by a mountain and near it runs a river. The surroundings are calmly beautiful.

The Mining Society of Nova Scotia, the Provincial Government, and the coal operators joined to honour his memory. Representatives of all attended his funeral. From Ottawa came messages of sympathy. But it is pleasant to remember that appreciation and recognition came before Death called. We remember not one but several occasions on which the Mining Society of Nova Scotia, in annual meeting assembled, expressed its high sense of Fletcher's worth. On these occasions nothing was more noticeable than the sensitive modesty of the man. The shy, whimsical, altogether manly way in which he would receive the most flattering encomiums was one of his chief charms.

It is proposed, and the proposal meets with our warmest approval, to erect a tablet or monument to the memory of Fletcher in the new Technical College at Halifax. This is well. But a better and more effective memorial would be the founding of a "Hugh Fletcher" chair in geology.

Linked with Fletcher's name in working out the

geological problems of Nova Scotia is the name of Fletcher's friend, E. R. Faribault, another faithful officer of the Survey. Although their spheres were quite distinct, both were animated by the same high purposes, and the names of both have been coupled in many a toast at the dinners of the Mining Society of Nova Scotia. And those names have stood and will continue to stand, as symbols of professional integrity and zeal, and lofty impersonal ambition for the work's sake.

### THE DEPARTMENT OF TRADE AND COMMERCE.

A special note has just been sent by the Dominion Department of Trade and Commerce to every publication in Canada. Enclosed with the note is a circular form from the Export Bureau of the Department. This form is being distributed to the members of all Boards of Trade, Chambers of Commerce, and Trade Associations throughout the Dominion. When filled in and returned, the forms will give the Department the material for compiling an Index of Canadian Manufacturers, Exporters, and Producers. When this exhaustive compilation is complete it will be printed and sent to all the Canadian Trade Commissioners in the various parts of the world.

This is the first effort of the kind ever made in Canada. That it will facilitate trade is certain. But its value will depend upon its completeness. Printed forms are usually thrown into the waste-basket. Most of them deserve this fate. The Department's form, however, can be made a thing of value. The Department gives its service gratuitously. The amount of labour involved, so far as the Department is concerned, is immense. The one object of this labour is to open new channels of commerce for Canada. We believe that the proposed Index will be of large use to mine operators. For many Canadian minerals and mineral products there could be built up a considerable European demand. A ready source of reference, placed where the enquirer can see it with least trouble, will form an effective connecting link between the Canadian mineral producer and the foreign consumer. And no one can deny that this is badly needed.

### THE NANAIMO DISASTER.

Thirty lives were lost in an explosion in No. 2 Mine Extension of the Wellington Colliery Nanaimo, B.C., on October 5.

No authentic details have been received before going to press. It is, therefore, superfluous to indulge in speculation as to the cause of the explosion.

But it is entirely appropriate to point out that upon the Government of British Columbia devolves the duty of making immediate and complete investigation of the circumstances leading up to the disaster. More than this, it is imperative that the present working conditions of the collieries of the province be fully ascertained.

We have grave doubts as to the efficiency (in numerical strength if in nothing else) of the present B. inspectorate. The duty of investigating such sad occurrences as this calls for ability of a high order. More experience of a very special kind is required.

Modern research, both in America and Europe, has thrown much light upon the nature and causes of colliery explosions. To a large extent they are preventable. The government of British Columbia should lose not a moment in taking whatever steps are recognized as necessary by the most enlightened authorities of the day. The snuffing out of thirty lives is a sufficient poignant object lesson.

### FAIRY GOLD.

A certain son of Belial is loose in the Lake of the Woods. Here, at Kenora, he has built him a place wherein, by occult means, he renders from the ore gold not extractable by fire-assay nor by any other device known to man.

Indeed, if you wish to get some idea of what this gentleman at Kenora can do to a gold ore, all that is necessary is to multiply by three or four the results obtained by an ordinary or garden variety of assays. And so convincing is the manner of this Kenora process that several mature citizens have not abstained from chipping in with him.

We are not unfamiliar with the kind of process that is being exploited in Kenora. There are many such varieties, based upon the alleged existence of "queen gold," "latent" gold, etc., etc., and etc. But the real object of search in all these processes is another allotropic form of the metal named "fools'" gold.

Surely, surely, Kenora should have cut its wisdom teeth by this time!

### ANOTHER CLAIMANT FOR THE POLE.

A third disputant has been added to the North Pole row. Our readers will notice in the letter of our Glenora Bay correspondent a substantial claim put forward for the Dominion Coal Company. Peary's steamer, the "Roosevelt," was bunkered with Dominion coal, and our correspondent appears to fancy that this amounts to a lien upon the Pole. Is it possible that the fee was not paid for? Internal evidence, chiefly the fact that President Taft refused to accept the Pole as a gift, seems to strengthen this supposition. It will not surprise us if Mr. James Ross makes the next move in the game. In fact, if Mr. Ross has a valid excuse for attaching the Pole, we shall rise up and call him blessed. Obviously this is the only means of squealing Cook and Peary.

### GOOD WORK.

The Temiscaming Mine Managers' Association, Cobalt, has taken upon its shoulders the load of caring for the sick in that fever-stricken town. With many



yellous crassness, the town authorities refused to see the gravity of the situation. Officially nothing was done until the association literally forced itself into control of the situation.

It is fortunate for Cobalt that the Mine Managers' Association is composed of live, fearless, and humane men. To the enlightenment of its officers and members is to be credited the effective measures that have at last been taken to fight the typhoid plague.

The Canadian Mining Journal desires to give expression to its warm appreciation of the spirit that animates the Temiscaming Mine Managers' Association. Long may it flourish.

---

### EDITORIAL NOTES.

We are glad to notice evidence of renewed interest in the silver mines of the Thunder Bay district. It is probable that the chief obstruction to progress is the fact that much of the mining land is held under old Crown grants and cannot be alienated except by special act of legislature. However, since the district has been moribund for so long, outside help should be eagerly welcomed.

---

The lead refinery of the Consolidated Mining and Smelting Company, Trail, B.C., was merely an experimental plant in 1902. It had then a capacity of six and one-half tons per day, and ten men were employed. To-day its capacity is 70 tons per day, or about 2,000 tons per month. Its employees number fifty. Its equipment is not only modern, but is, perhaps, the most efficient in existence.

The currency of the Chinese Empire is almost hopelessly complicated. Long ago the silver tael was the standard of weight. To-day the actual weight standard is the copper "cash." The value of silver currency is based upon the "cash," but in no well-defined relationship. The silver "dollars" of the different provinces and of foreign countries and the enormous number of 5-cent and 10-cent pieces in circulation further confound matters. The provincial mints have turned out such quantities of these coins that they are now subject to discounts ranging from 3 per cent. to 10 per cent. The Chinese market for silver is at present steady and strong.

---

Unless we are sadly mistaken those in control of the Waldman mining claims on the Gillies Limit are preparing for a stock-selling campaign. For some time readers of Toronto and Montreal newspapers have been kept artfully on the qui vive. The psychological moment for offering shares to the public may arrive at any moment. It will then be well for the public to remember that, so far as investment is concerned, the Waldman is an unknown quantity.

---

An enterprising firm of brokers and bankers, F. B. McCurdy and Co., Halifax, N.S., is distributing an unusually useful little handbook entitled "Nova Scotia Financial Register, 1909." The Register contains a list of incorporated towns and municipalities along with their financial statements, and a classified schedule of incorporated companies. In this latter list we notice many mining companies. We make special mention of this "Register," because of the excellent manner in which it is compiled. It will serve as a model for similar work in other provinces.

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## THE PLANT AND EQUIPMENT OF THE COBALT HYDRAULIC COMPANY.

### A Description of Their Taylor Air Compressor Plant at Ragged Chutes, on the Montreal River.

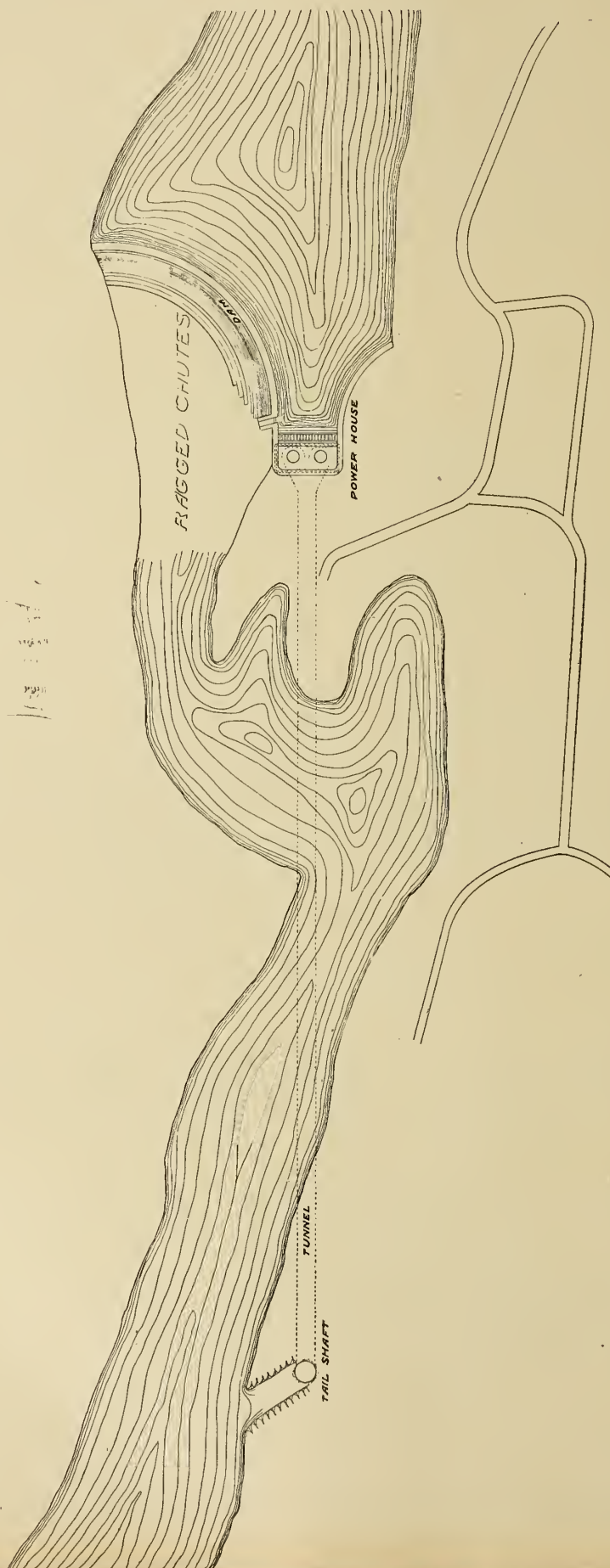
Apart from the erection of concentration plants, or, more correctly, conjointly with this development, the harnessing of the superb water-powers in the country surrounding Cobalt is the most significant feature in the industrial growth of silver mining in Northern Ontario.

The hydraulic air compressing plant of the Cobalt Hydraulic Company is one of several large concerns that will supply the mines of Cobalt and its environs with power at about one-third the present cost. The company's plant is situated at Ragged Chutes, eight miles south-west of Cobalt. Roughly, 10,000 horsepower be developed at Ragged Chutes at low water. The

Cobalt Hydraulic Company's plant is calculated to furnish 5,500 h.p., more than enough to supply the present available power market in Cobalt mines.

The plant is practically automatic, as the air compression is effected on the Taylor system by the direct action of falling water.

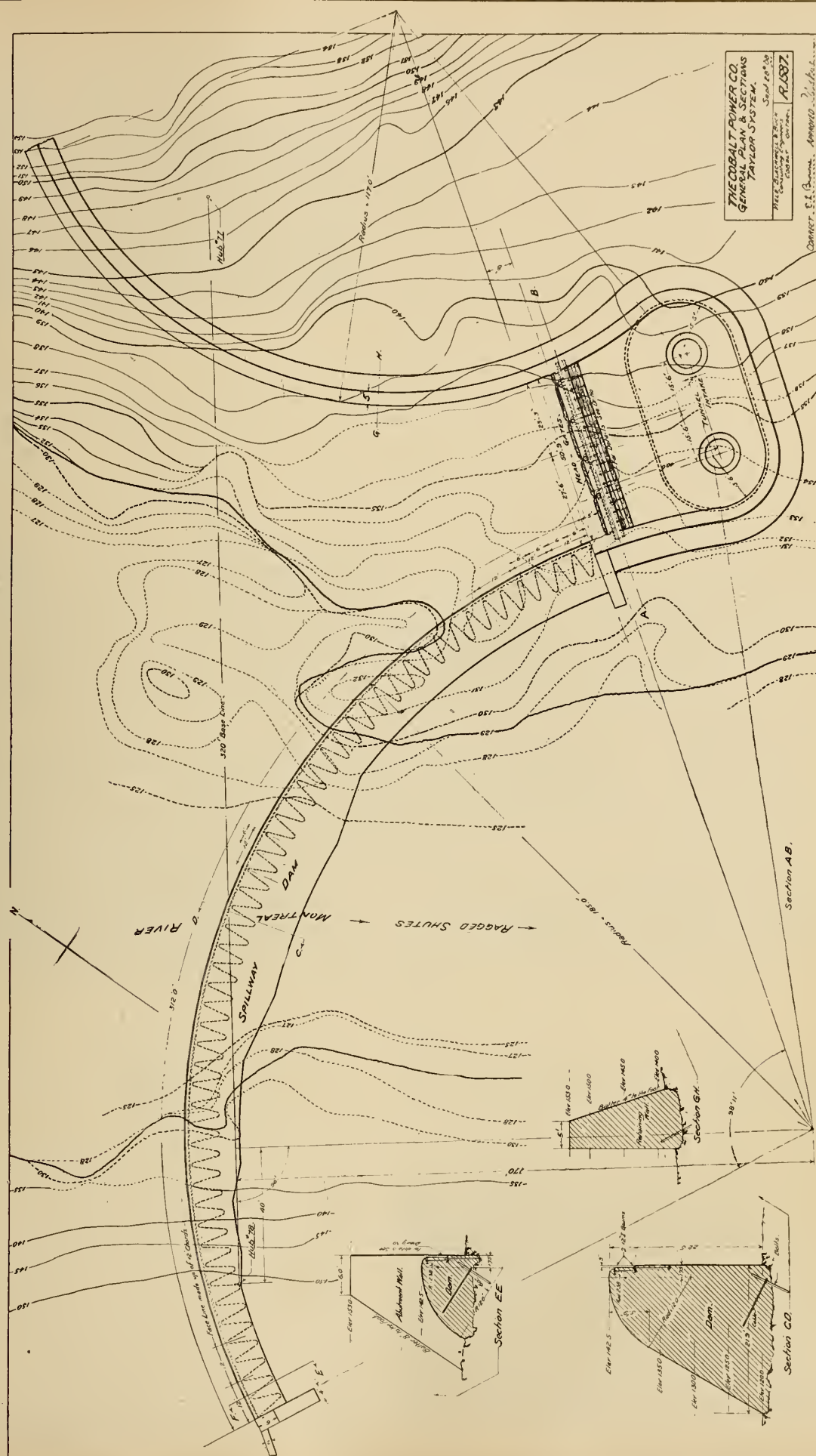
Although the principle involved in the Ragged Chutes installation has been utilized for many centuries, it is only with the last few years that successful commercial applications of this principle have been made on a large scale. Modern plants, such as that built in 1900 at Ainsworth, B.C., by the Kootenay Air Supply Co., are all based upon the system elaborated

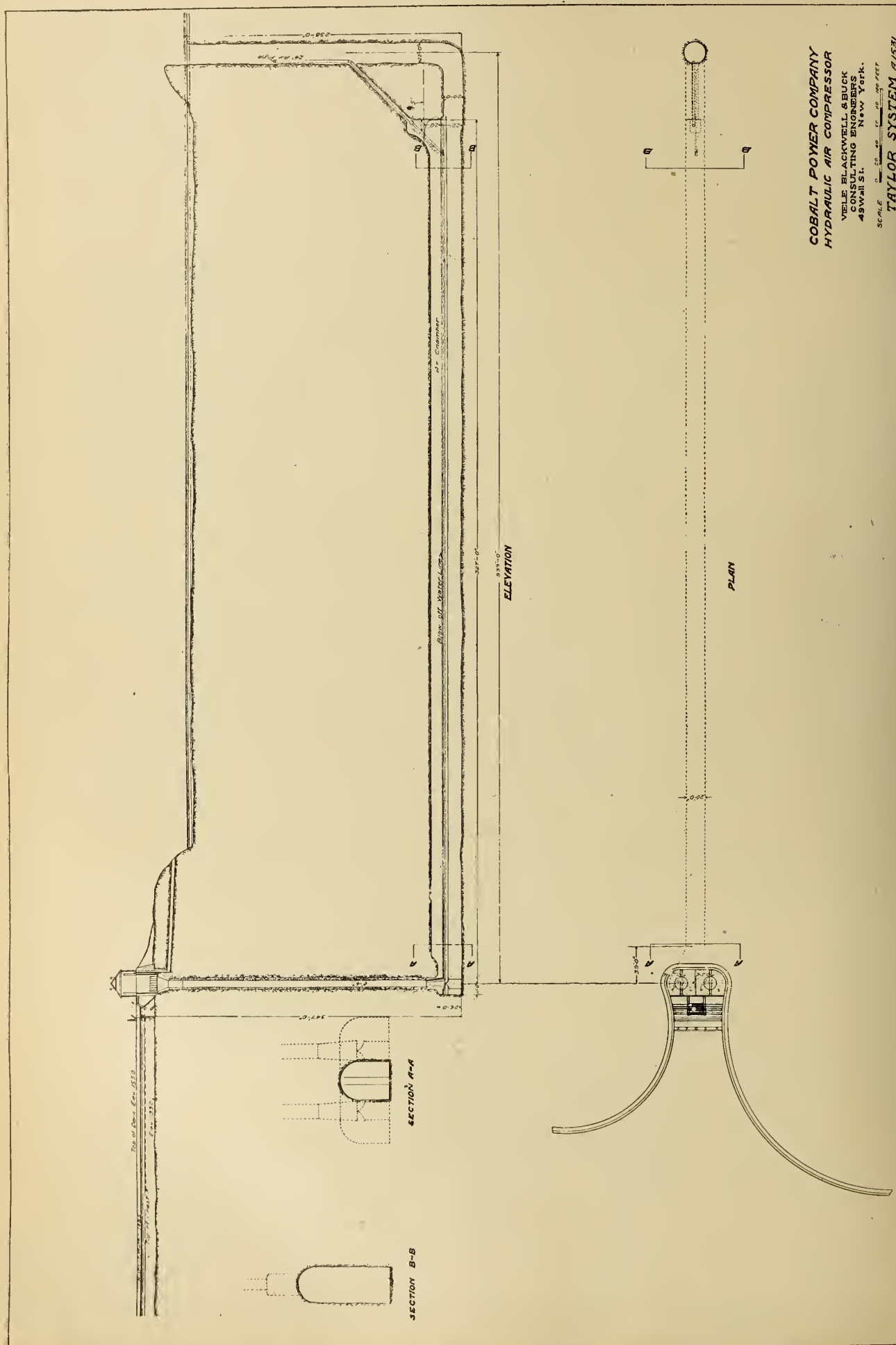


COBALT POWER COMPANY  
HYDRAULIC AIR COMPRESSOR  
VIELE BLACKWELL & BUCK  
CONSULTING ENGINEERS  
49 WALL ST.  
NEW YORK.

SCALE 1" = 100' FEET  
TAYLOR SYSTEM











Part of General View.

are reduced to a diameter of 9 feet immediately below the spider. Forty feet from the bottom of the shaft the diameter is increased to  $11\frac{1}{2}$  feet. This increase of diameter tends to lessen the compression and to liberate the air. Two steel-sheathed concrete cones receive the full impact of the water and direct it into a horizontal tunnel 1,021 feet long, following the flow of the river. The tunnel is 22 feet wide and near the bottom of the tail-shaft 42 feet high. At the bottom of the intake it is about half this height. (See Fig. 1, Sections AA and BB.)

Diverted into this commodious channel, the water loses momentum, and the air is freed rapidly. It is now under a compression of 125 lb. per cubic foot. At this pressure it loses all but a negligible amount of its



Part of General View.

by Charles H. Taylor, of Montreal, who, in 1896, devised the equipment of the Dominion Cotton Mills, at Sagoy, Quebec.

Mr. Taylor's modification simply consisted in an effective method of breaking up the water and impregnating it with finely divided particles of air.

The Ragged Chutes plant is probably the largest artificial compressor in the world. A 660-foot dam stretches across the Montreal River at Ragged Chutes. Here, at the intake gates, are two 16-foot intake pipes, each of which is fitted 66 air-intake pipes 14 inches in diameter, placed some feet above the level at which the water enters the larger pipes, and set in a steel siding around these. The spider's conical extension partly occupies the mouth of the large intake pipe so as to leave an annular space for the water to enter. The falling water draws air in through the small pipes, and thus in its descent of 351 feet becomes a mixture of water and compressed air. The water intake pipes



Part of General View.



moisture. Near the bottom of the tail-shaft (see elevation, Fig. 1) a 24-inch steel pipe enters the tunnel and conduits the air to the surface, and into the twenty-inch main that serves the mines. The water races past, and, as the tunnel is smaller at this point, forms an air-tight seal that leaves the compressed air no other

in the system. Elaborate care has been taken with gaskets and with joints to insure absolute air-tightness. Every joint is supported by two rails which, in turn, are bolted to wooden ties buried beyond danger of damage by fire or weather.

Two 12-inch service pipes now connect the 20-inch

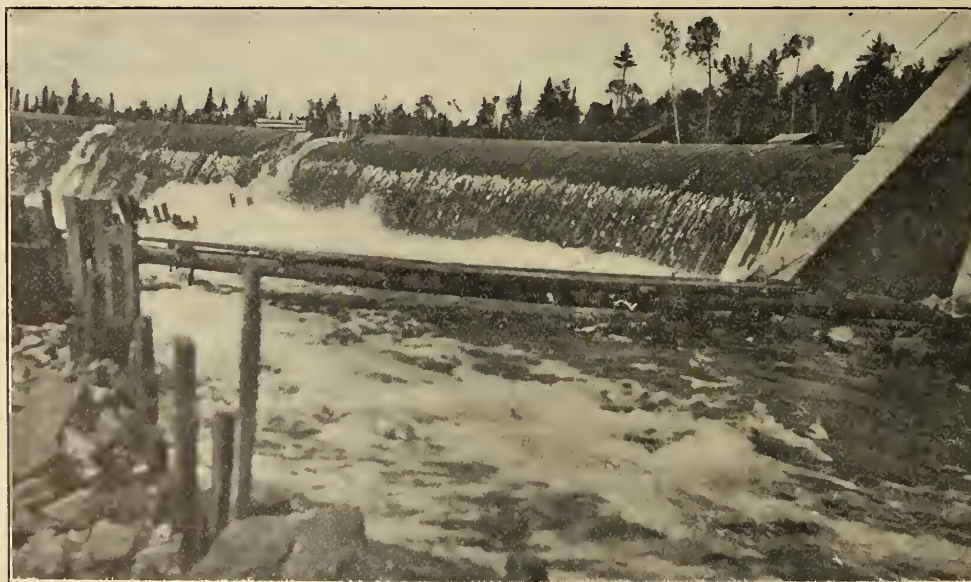


Cobalt Hydraulic Power Co.—Construction Camp and East Abutment of Dam, Ragged Chutes.

vent. The water itself enters the tail-shaft, and, since there is a drop of 48 feet between the intake and the mouth of the tail-shaft, it overflows into the river.

The 20-inch main is constructed of steel pipes brought from Germany. It is made up of 40-foot

main with La Rose. One of these loops through the Nipissing, Trethewey, Coniagas, Cobalt Central, Buffalo, Townsite, McKinley-Darragh, and back to the Nipissing. The other is carried over La Rose, Nipissing, O'Brien, Colonial, Victoria, and Nova Scotia.



Cobalt Hydraulic Power Co.—Spillway of Dam, Ragged Chutes.

lengths of seamless flanged steel, each length weighing 3,000 lb.

To guard against the evil effects of unequal temperatures, the pipe-line is anchored to heavy concrete piers on solid rock foundation at half-mile intervals. Halfway between each pier an expansion point is fitted

third line will run north of Giroux Lake through the University, Foster, and other properties in that region. A fourth line is projected through in the direction of the Cobalt Merger.

The middle of November is set as the time when it will be ready for delivery into Cobalt. Twenty-five



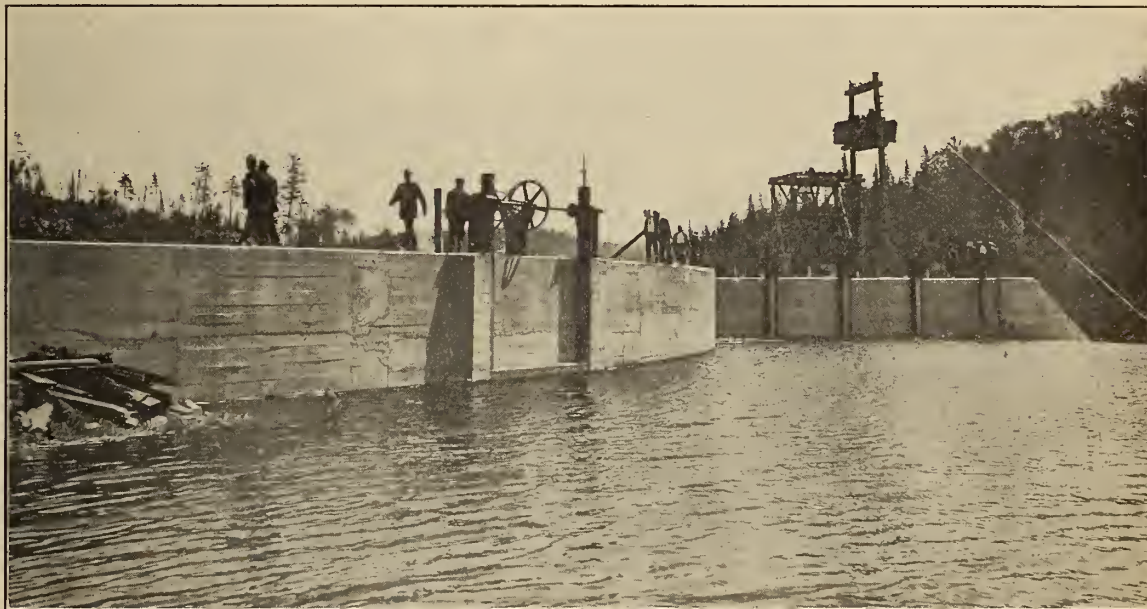


Cobalt Hydraulic Power Co.—Looking Up Stream toward Dam and Head Works and showing Ragged Chutes.

cents per thousand cubic feet at 100 lb. pressure is the rate to be charged. This, of course, is a radical reduction of existing costs. The pressure will be uniform, the air dry, and the service not subject to interruptions.

Among other contracts, the following eight mines

have signed for approximately one-third of the total capacity of the plant: La Rose, 350 cu. ft.; Nipissing, 250 cu. ft.; Kerr Lake, 200 cu. ft.; Coniagas, 150 cu. ft.; King Edward, 175 cu. ft.; Buffalo, 150 cu. ft.; Chambers-Ferland, 150 cu. ft.; and Colonial, 50 cu. ft.



Cobalt Hydraulic Power Co.—Intake Gates and part of Dam.

### EVOLUTION OF DREDGES.

At the meeting of the Oroville Dredging Company, recently held in London, the chairman referred to an important development in the size of dredges likely to reduce working costs from 7 to 3 cents per cubic yard. He said they are now using 7 ft. buckets in their largest type, whilst neighbours in California are using 14 ft. bucket dredges. He had seen the accounts of the company operating the 14 ft. bucket dredges handling

250,000 cubic yards a month at a cost of under 3 cents per cubic yard. "Now, it does not require a great deal of intelligence," Mr. Baker continued, "to realize that if you have a property with a life of ten years, as we have in the Oroville alone, where operating costs are nearly 7 cents per cubic yard, if we can put in two 14 ft. bucket dredges at a cost of £80,000 we can make an economy. These dredges will each treat 250,000 cubic yards a month, or six million cubic yards in a year. With





Cobalt Hydraulic Power Company.  
Looking Down Montreal River from point near Intake—Head-house of Intake in Distance.

these we could repay the cost of the two dredges in 18 months out of economies we can make in operating at a cost of under 3 cents, as against a cost of nearly 7 cents to-day." The large bucket dredges have been in actual operation for a little over a year, and the properties on which they are located are being examined by an engineer of high standing, and if he confirms the statements as to capacity and costs it is the intention of the Oroville Dredging Company to scrap most of its old dredges and put in the big modern dredges. In dealing with six million cubic yards a saving of 4 cents is equal to about £50,000 annually."

The above statement is really of world-wide importance, and will do to the dredging industry what the

tube mill has done to the quartz mining industry. It will reduce costs of dredging to such an enormous extent as to permit of immense areas of formerly unpayable ground being profitably worked and give a great impetus to dredge construction, already an important industry. The advertisement of no fewer than three of the foremost firms of dredge builders in the world appear in the advertising columns of this issue, and the writer has marked the extraordinary progress which has been made in the latest designs of dredge construction. These modern dredges have outdistanced even the latest New Zealand designs, which have until recently been considered the most advanced in this class of work.—Financial Times, London.

## Riviere Du Loup Goldfields—Townships of Jersey and Liniere, Beauce County, Quebec.

Notes and Extracts from a Special Report by Dr. Henry Youle Hind, M.A., F.R.G.S., Published in the Year 1864.

Written for the Canadian Mining Journal.

Of the numberless minor reports written by the late Dr. Henry Youle Hind, none is of more present interest than that on the Riviere du Loup goldfields, written for a group of Boston investors.

The report proper is prefaced by a letter of transmittal from an Examining Committee. This letter, quaintly reminiscent of pre-Confederation days, sanctions "the purchase of certain lands and mining rights situated on the Riviere du Loup, emptying into the Chaudiere, in Lower Canada." It is addressed to "the subscribers to the conditional agreement, dated at Boston, May 6th, 1864." The letter itself is dated at Boston, June 23rd, 1864. The members of the committee

bore names that were prominent in the business circles of Boston half a century ago. Here they are: Leverett Saltonstall, Danl. Sargent Curtis, P. C. Brooks, Jr., S. L. French, H. B. Ward, Pliny Fisk.

The committee touches first upon the direct and easy access afforded to the district by the Kennebec road from Quebec, and by the settled character of the surrounding country. It is remarked that ten miles of the Kennebec road is macadamized, and that the district is within forty-eight hours' travel from Boston. To-day one can travel in about one-quarter of that time all the way from the city of Quebec to Boston.

The specialists engaged by the Examining Commit-



ee, in addition to Dr. Hind, to report upon the district were Mr. Russell and Mr. Tuck, Californian miners, and Mr. St. John, "a successful quartz miner of Australia."

The letter of transmittal dwells upon Dr. Hind's distinguished geological and exploratory work, and mentions that, at the date of writing, he was engaged in making a preliminary geological survey of the province of New Brunswick at the request of the Government of that colony.

"Your Committee," the letter continues, "were also fortunate enough to have an interview, arranged by appointment, with Sir William Logan, the eminent geologist of Canada, who has been for upwards of twenty years employed by the British Government in the survey of Canada and other portions of British America, who expressed to your Committee the deliberate opinion that operations properly conducted upon this auriferous tract must prove highly remunerative."

Subject to the condition that the titles upon examination proved satisfactory, the committee closed negotiations for the purchase of the lands. All legal points were submitted to the consideration of George Okill Stuart, Esq., of Quebec, "a gentleman of the highest standing in the legal profession, and now, or lately, Queen's Counsel."

Dr. Hind's report is divided under seven heads, to each of which shall be given some attention.

### I. Geographical Features.

The tract of country to which the report refers lies on the Riviere du Loup, a tributary to the Chaudiere, which empties into the St. Lawrence a few miles above Quebec. The Metgermette, a tributary of the Du Loup, flows diagonally through all the lots in Linière. Several small tributaries flow through the lots into the Du Loup.

East and west of the Du Loup the country rises to a plateau in some places in the form of an escarpment on the river, in others gradually, to an altitude varying from sixty to one hundred and twenty feet above the level of the stream. Where the rise is abrupt, landslides occasionally disclose the character of the sloping cliffs. These are seen to consist of a tenacious bluish clay, holding many worn fragments of rocks similar to the Upper Silurian slates exposed in the bed of the river, and masses of unworn slate showing a local origin, also small boulders and pebbles from a northern source.

In the ancient valley of the river the blue clay may be, in some places, fifty feet thick. But by tracing the course of the tributary streams, about two miles from the Riviere du Loup, and to an altitude exceeding 400 feet, the slates are seen in position some 25 to 30 feet below the surface of the drift clays and gravels.

The blue clay is capped by a yellowish gravelly clay, also holding numerous fragments of unworn masses of slate, as well as fragments of ferruginous, easily disintegrated quartz, similar to the interstratified quartz veins in the slates beneath.

The plateaux, referred to above, vary in breadth from a few yards to several hundred yards, and are succeeded on the west by a gradual rise to the summit of the ridge dividing the tributaries of the Du Loup from those of the Chaudiere. The highest points are not more than 500 feet above the river, or, approximately, 1,400 feet above the sea level.

The Du Loup, at its summer level, has an average width of twenty-five yards, its depth not exceeding fifteen inches. At the beginning of June its mean

breadth is about thirty yards, with a depth in the channel of eighteen or twenty inches. In the early spring it rises fully five feet above its June level.

The current is very rapid, and its fall may be approximately estimated at twelve feet in the mile. In its bed are numerous boulders, mostly from the Upper Silurian slates, reefs of which cross the river occasionally.

The course of the Du Loup, within the property described, is nearly due north for a space of nine miles.

### II. Geological Features.

(a) **Upper Silurian Slates.**—The rocks consist of Upper Silurian slates. The strike is west  $15^{\circ}$  south, magnetic; but the variation being  $16^{\circ} 45'$  east, the true strike is west  $31^{\circ}$  south. The dip is southerly, at a very high grade, varying from  $72^{\circ}$  on the Metgermette to  $85^{\circ}$  on the Riviere du Loup. The slates appear in situ in many places on the Metgermette, the Riviere du Loup, and on a mill creek (lot 31, and the rear lot on the 8th. range of Jersey) at an altitude of about 400 feet above the main stream.

Reefs of these slates frequently cross the main river and its tributaries, forming rapids. Sometimes they present a banded or ribboned appearance, and occasionally a smooth reddish surface, and an arenaceous composition. When exposed to the action of air and running water they occasionally become very fissile, wearing down and disintegrating rapidly. Other bands, again, are hard and persistent, weathering red when exposed to running water. Sometimes a slab several feet square will be found to be studded with perfect cubes of iron pyrites.

(b) **Quartz Veins.**—The slates are intersected by three sets of quartz veins: 1. The largest and older veins, running generally with the strike of the slates, and often interbedded, but occasionally enlarging into branches, are highly crystalline, and composed, towards the centre, of white quartz containing cavities lined with quartz crystals. The outer portions of the veins are frequently coloured with peroxide of iron, and the cavities filled with decomposing iron pyrites, or, sometimes, with calcite or with chlorite. 2. The oblique veins.—When the slates crop out in the bed of the river they are sometimes seen to be capped with quartz, which sends numerous ramifications in all directions. One exposed reef, dipping at an angle of  $80^{\circ}$ , was found to be intersected by veins cutting them at an angle of  $56^{\circ}$  N.E. These oblique veins appear to be associated with the main veins, which generally run in the direction of the strike of the slates. Persons are liable to be much deceived by them, as they often expose a broad surface in the river; but none was found of a greater thickness than two or three inches. 3. The newest veins are the numerous small, continuous veins cutting the main veins either at right angles or obliquely. They are of more recent origin than either of the two systems described, and generally consist of quartz free from foreign material.

(To be continued.)

### PRESENT PROVISIONS OF U.S. TARIFF AS REGARDS ORES OF ZINC.

Zinc-bearing ore of all kinds, including calamine, containing less than ten per centum of zinc, shall be admitted free of duty; containing ten per centum or more of zinc and less than twenty per centum, one-fourth of



one cent per pound on the zinc contained therein; containing twenty per centum or more of zinc and less than twenty-five per centum, one-half of one cent per pound on the zinc contained therein; containing twenty-five per centum of zinc or more, one cent per pound on the zinc contained therein: Provided, that on all importations of zinc-bearing ores the duties shall be estimated at the port of entry, and a bond given in double the amount of such estimated duties for the transportation of the ores by common carriers bonded for the transportation of appraised or unappraised merchandise to properly equipped sampling or smelting establishments, whether designated as bonded warehouses or otherwise. On the arrival of the ores at such establishments they shall be sampled, according to commercial methods under the supervision of government officers, who shall be stationed at such establishments, and who shall submit the samples thus obtained to a government assayer, designated by the Secretary of the Treasury, who shall make a proper assay of the sample, and report the result to the proper customs officers, and the import entries shall be liquidated thereon, except in case of ores that shall be removed to a bonded warehouse to be refined for exportation as provided by law. And the Secretary of the Treasury is authorized to make all necessary regulations to enforce the provisions of this paragraph.

#### PRODUCTION OF IRON AND STEEL BY THE ELECTRIC SMELTING PROCESS.\*

By E. J. Ljungberg (Falun, Sweden).

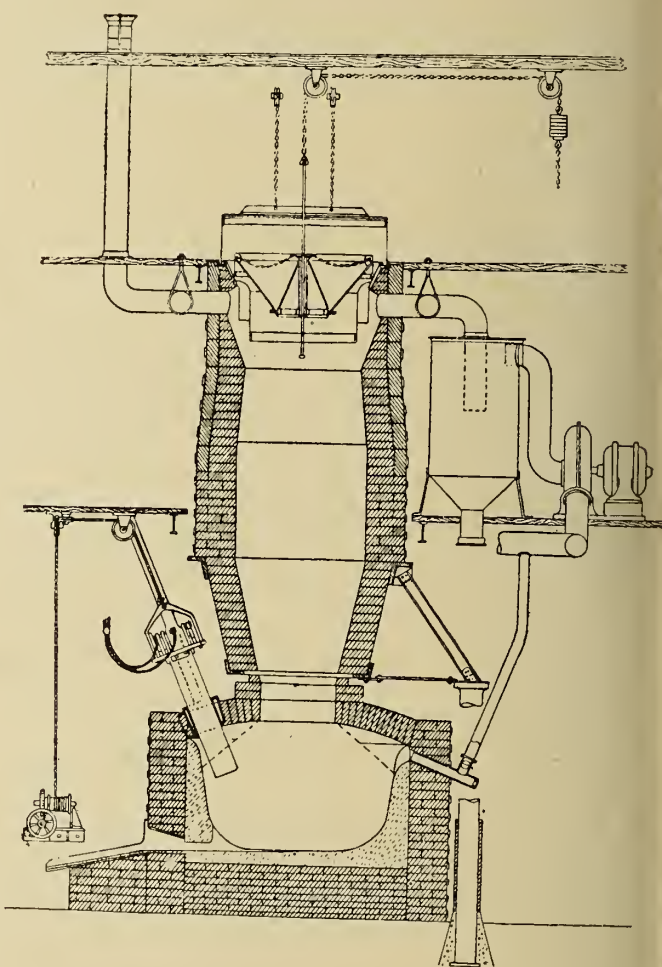
On the whole there is at present not much more to add to what has already been published concerning the melting of steel by use of electric current. Many types of furnace have been evolved and constructed—the Heroult, Kjellin, Stassano, Girod, Rochling-Rodenhauer, and others. It is also well known that furnaces up to a capacity of 15 tons have been built for making special steel with good commercial results. For making steel of ordinary quality the electric method still seems to be too expensive, even where cheap water-power is available.

At Gysinge, one of the works belonging to the Stora Kopparbergs Bergslag, there is one Kjellin induction furnace with a capacity of 2 tons, but as this is working as a Talbot furnace, not more than about one ton at a time is tapped.

The continuous current used in this furnace represents about 200 kilowatts, and the output in 300 days amounts to about 1,200 tons of ingots using 50 per cent. pig and fifty per cent. scrap. As no other pig iron is used except the famous Dannemora brand made by the firm, which, as every one knows, is extremely low in phosphorus and sulphur, the process can hardly be called a refining process. The product is a carbon steel of high quality, possessing some superiority over steel made by the ordinary melting processes, the quality which I would instance specially being that it is comparatively soft to work, either hot or cold, although high in carbon. It is a superior carbon tool steel. It may be of interest to state that the company makes about 15,000 tons of Dannemora charcoal pig iron annually, of which about one-third is exported and two-thirds are used at the works at Soderfors and Elfkärle for the manufacture of Dannemora Wallon bar iron, open-hearth, and crucible steel.

In the electric furnace, as well as in the crucible plant, there are also produced, among different kinds of steel, high speed self-hardening steel, tungsten steel, chromium steel, and nickel steel. Such steels can easily be made in electric furnaces when the necessary care is taken. When speaking of high quality steel all steelmakers know that the utmost care in heating, hammering, rolling, and tempering is necessary if good result is to be obtained.

For a country like Sweden, possessing practically no coal-mines but numerous waterfalls, the manufacture of iron and steel direct from ore by the agency of the electric current is of much more interest than the melting of pig and scrap to make steel. At the works at Domnarfvet extensive and costly trials have therefore been made in the direct reduction of ore during this and the past few years.



In these experiments two modifications of a furnace constructed by Mr. Wallin in Berlin, and several modifications of a furnace, constructed by Messrs. Gronva & Lindblad (the Electro Metal Company), Ludvika, have been tried. Of these it is needless to describe any except the latest form.

The accompanying drawing shows a furnace similar to a common blast-furnace, but with three electrodes fed by three-phase alternating current at about 40 volt 60 cycles, and 9500 amperes, averaging 674 horse-power, instead of tuyeres. In this furnace, which has been running for 1903 hours, there have been produced 28 tons of iron, containing from 0.95 to 3.09 per cent of carbon.

\*Paper read before the Iron and Steel Institute.



In the manufacture of this quantity there was used:—

|                                        | Tons.   |
|----------------------------------------|---------|
| Ore .....                              | 442     |
| Lime .....                             | 24      |
| Coke .....                             | 41      |
| Charcoal .....                         | 58      |
| Electrodes, total .....                | 6.5     |
| Electric current (kilowatt-hours) .... | 891,623 |

or per metric ton of pig iron produced:—

|                                    | Kilogrammes. |
|------------------------------------|--------------|
| Coke and charcoal .....            | 353.3        |
| Power, horsepower year .....       | 0.492        |
| Electrodes, effective .....        | 8.8 kgs.     |
| Wasted ends .....                  | 13.9 kgs.    |
|                                    | 22.7         |
| Pig iron from ore and lime .....   | 60.02        |
| Pig iron from ore alone .....      | 63.50        |
| Pig iron per horsepower year ..... | 2.03 tons    |

The temperature of the escaping gases from the furnace is generally very low, and contain on an average about 22 per cent. of carbon dioxide (from 8 to 41 per cent.). The amount of carbon monoxide varies from 39.4 per cent. to 61 per cent. The gases contain practically no nitrogen, but steam from the water in the ore, lime, coke, or charcoal is present.

The efficiency of the electric current ought to be higher than hitherto, if the considerable loss of heat by cooling water and radiation can be reduced. These losses seem to be about 30 per cent.

No air whatever is used in the process, and the gases are produced from the carbon in the charcoal and coke and the oxygen in the ores ( $\text{FeO} + \text{C} = \text{Fe} + \text{CO}$ ). Either charcoal or coke may be used, but the consumption of fuel will be practically the same in either case.

According to the description of the inventor, the figure shows a vertical section, through the furnace

which consists of a lower portion or smelting chamber, corresponding to the hearth of a blast-furnace, and a top section or shaft. The latter is supported on columns, which prevent any weight from bearing on the arch of the smelting chamber. The latter is so proportioned as to provide a considerable amount of free space between the charge and the arched roof through which the carbon electrodes project into the charge. The brickwork is thus protected against any very high temperature, and remains a non-conductor of electricity. This is an important feature of this furnace, since experiment has shown that if the electrodes enter the chamber at the point where the charge touches the walls, a very high temperature is generated at this point; the brickwork is destroyed and becomes a conductor of electricity, giving rise to a more or less complete short-circuit. The brickwork may be further cooled by means of a blast of cool gas taken from the top of the furnace and blown in round the electrodes with a fan, no heat being lost by this proceeding.

The ore and fuel are crushed to a suitable size, and are fed into the top of the furnace through the bell hopper in the usual way, the ore being partially reduced by the carbon monoxide rising through the charge. The latter spreads out in the smelting chamber, as shown, and the reduction is there completed. Since the electrodes project well into the charge, the highest temperature occurs in the centre of the latter, and the brickwork is thus kept cool compared with the walls of an ordinary blast-furnace.

It will be seen from the figures given in the paper that a step has been taken in the direction of replacing a considerable part of the fuel used in making iron and steel by the electric current, and that the problem is technically solved. As regards its commercial value, it is too early to make any definite statement yet, but this will be readily understood by all iron and steel makers when they reflect how many years it has taken to bring the Bessemer, the open-hearth, and the basic processes to their present state of perfection.

## IRON ORE DEPOSITS OF NOVA SCOTIA.

(Continued from issue of Sept. 15.)

\*Notes from report by Dr. J. E. Woodman, issued by Mines Branch, Department of Mines, Ottawa.

### The Nictaux-Torbrook Basin.

**Location, extent and ownership.**—The important iron ore field of Torbrook and Nictaux is situated in eastern Annapolis county, on the south side of the Annapolis river valley and against the side of the highland to the south, locally called South mountain. The distance from the old Leekie mine to Wilmot, on the Dominion Atlantic railway, is 3 miles; from the Wheelock mine, 4.8. From Wilmot to Acadia mines, via Midland division (Windsor to Truro), 137 miles; via Windsor Junction, 153 miles.

It stretches from the Kings-Annapolis county line on the east to the granite back of Cleveland mountain on the west, a distance of seven miles. Its breadth is in places 15,000 feet from the granites on the south to the Triassic rocks on the north, but the utmost width of probable ore-bearing rock is 11,500 feet. Thus the ter-

ritory within which iron ore is likely to be found may be roughly placed at fifteen square miles.

The iron ore deposits here, as at Clementsport, are held with the land, hence no royalty is paid upon the mineral. A large part of the district is now owned or controlled by the Annapolis Iron Company. The Londonderry Iron and Mining Company owns some of the remainder of the territory and controls still more. A few farms have not been included in these operations.

**Topography and general features.**—The district is part of an open farm country, easy of access at all times. The general trend of the topography is north-east in the main part of the field, owing to the line of slope of South mountain and the direction of Torbrook or Black river. This stream, flowing from South mountain northward into the centre of the basin, there turns north-east almost to the county line; thence north-west, passing out of the basin to the Annapolis river. The valley is narrow and steep where it emerges from South moun-



tain, but becomes broad and flat in the main part of the basin, so that few outcrops can be found along it.

North-west of this river, where the mines are situated, the land is again higher, although in no part more than 400 feet above the stream. Within half a mile of the latter it begins to decline toward the Annapolis river.

It is upon this very broad, ridge-like eminence that the north line of ore outcrops is situated, in the form of three, or possibly more, beds of iron ore interstratified with the sedimentary rocks of the region.

The southern line of ore, similarly situated with reference to the country rock, is found well up on the side of South mountain and everywhere at considerably greater altitude than the other, within a short distance of the granite which covers a large part of western Nova Scotia. The outcrops and openings are high on the west, declining eastward, because the strike of the deposit is slightly oblique to the trend of the South mountain escarpment, diverging in that direction. In like manner the altitude of the north line of the ore deposit declines eastward, being 365 feet at the Wheelock mine on the west, 131 feet at the Leckie mine on the east, and somewhat lower at the crossing of Torbrook river still farther east. The grades from the South mountain iron ore deposit towards the railroad on the north are rather severe at any point.

**Transportation.**—Transportation is not a serious problem in this field. For some years a spur line of standard gauge has run from Wilmot station southward 3 miles to the Leckie mine, over an almost level country. Thence it is 1.8 miles south-west to the Wheelock mine, with a rise of 234 feet. In 1906 the standard gauge track was extended to this part of the property, and in 1907 to a newer mine of small size, the Martin, somewhat farther west. As the Leckie mine is not now in operation, all the ore is conveyed from the Wheelock and Martin openings, which are nearly in the centre of the property, to Wilmot station. The district is controlled, and in large part owned, by the Annapolis Iron Company at Londonderry (Acadia Mines), where it is smelted into pig iron.

From the Wheelock mine to Nictaux station on the west is 2.27 miles, down a steep grade. Nevertheless it would not be difficult to connect with the Halifax and South-western railway at that point. This would insure opportunity to ship ore on the Bay of Fundy at Victoria beach by one rail haul, as this road belongs to the same interest as the first-named.

The South Mountain range of iron ore has not yet been opened sufficiently to warrant laying tracks from any present rail line, and greater difficulty would be experienced in grades.

Present transportation to Acadia Mines is unsatisfactory, as the ore has to be hauled over two lines. The Dominion Atlantic railway is used as far as Windsor in any case. From there two routes are possible; in one the ore goes to Truro by the Midland division of the Dominion Atlantic; in the other to Windsor Junction, the Dominion Atlantic and the Intercolonial sharing in this, thence to Truro and Londonderry by the Intercolonial railway. By either route freight charges are an important item.

**Water power and wood.**—Two streams of some size run through the district—the Nictaux and Torbrook rivers. Neither has natural storage in the form of head water lakes of any importance; and Torbrook (or Black) river has a valley so shaped that at no suitable

point could it be dammed without great injury to farming interests.

Nictaux river flows northward throughout the breadth of the district in a narrow valley which broadens when the Triassic rocks to the north are reached. This valley could be dammed at a number of points forming a succession of storage basins. As it is, there but one dam, a short distance above the falls at Nictaux.

The horse-power of the stream was taken during an unusually dry time, when the stream had shrunk to small proportions. Assuming the installation of power at the lowest feasible point—where the stream valley widens, north of the village of Nictaux—a head of 12 feet could be secured from the site of the old Nixco dam with 5,800 feet of piping, and a minimum of 13 h.p. without such storage as to increase the minimum volume of water. From the present dam at the falls a head of 77 feet can be secured, and the estimate gives 135 h.p., showing that the increased discharge counteracts the decreased head. This, of course, could be much augmented by proper storage. Previous estimates, made in private reports on the district, range from 250 to 75 h.p.

There is no timber in the district, and none of value for a few miles to the south. But in the heart of the south country is a larger amount of excellent wood both hard and soft, and of several varieties each, than many mines or electric smelters would require. The timber country is all controlled by one or another of the large lumber companies, with whom negotiations would have to be made.

**Local Smelting.**—The possibility of a new western smelting centre is here reverted to, in order to show the relations of the different factors in the case.

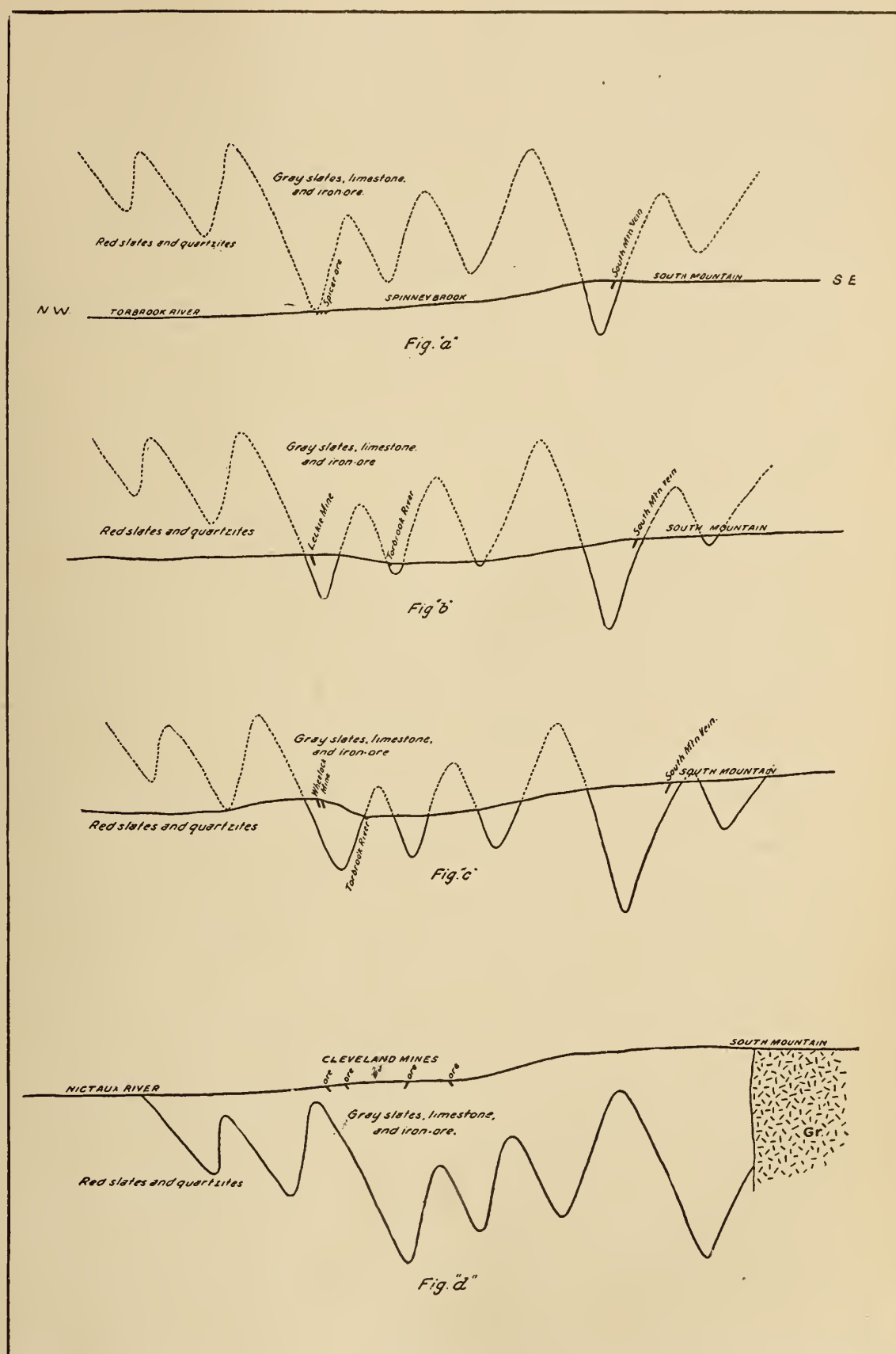
The problem presents three aspects. According to one, the district as a whole may be regarded as a smelting centre, the coal being brought from a distance. Second, the ore may be shipped to an existing furnace as Londonderry, Sydney or Sydney Mines. Third, it may be shipped to a new centre of reduction, to which also coal would have to be brought.

(1) There is undoubtedly sufficient ore in the basin to supply a moderate plant for so long a time as to warrant installation if other factors are favourable. In such event all the coal would have to be brought from a considerable distance, as western Nova Scotia south of Cumberland county possesses none. Coal could be had from any Cape Breton district by water shipment to Annapolis Royal, thence by rail to Torbrook or Nictaux if the works were there. From the Pictou field coal would come by rail from Stellarton or Westville to Pictou Landing, and by water to Annapolis. From the present Cumberland field (Springhill) coal would come by rail to the Cumberland Coal and Railway Company shipping piers at Parrsboro, thence by vessel across Cobequid bay to Annapolis. Instead of using Annapolis as a debarking point, Victoria Beach, opposite Digby, might be employed, but this would necessitate a longer rail haul.

Limestone could be brought from near Windsor and from other points in Hants county. That near Windsor is an especially good grade of shell lime of lower Carboniferous age, similar in many ways to that of Red Island, Cape Breton, used at present by the Nova Scotia Steel and Coal Company.

The distance from Wilmot, where the spur line leaves the Dominion Atlantic main tracks, to Annapolis is 32 miles; to Victoria Beach, 40 miles; and to Windsor





Diagrammatic section across centre of Nictaux-Torbrook basin, to illustrate possible synclinal structure.

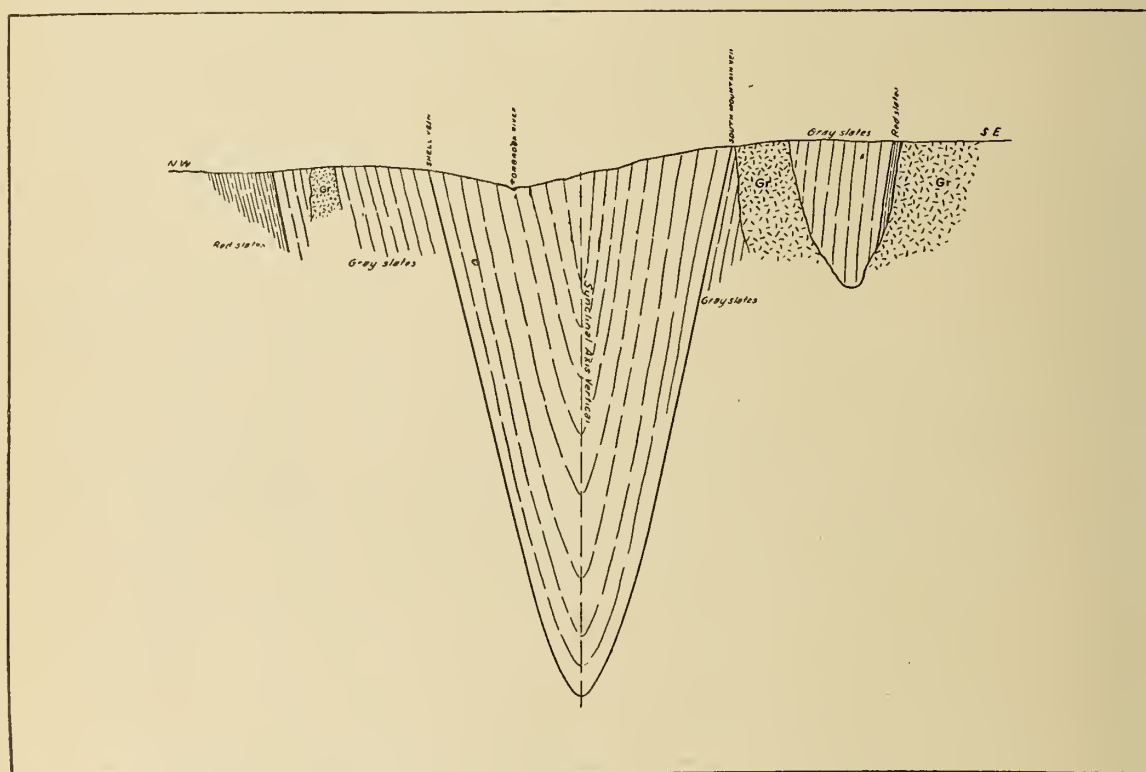
54 miles. In considering Victoria Beach for shipping, it must be noted that the Victoria Beach railway is a part of the Halifax and South-western system. Haulage from Torbrook would have to be over two lines at present, but by making connection at Nictaux station a single line would handle the ore.

In making calculations for large scale operations upon any but the present status, it must not be forgotten that the Clementsport district contains ores of a character sufficiently similar to those of Torbrook to bring its successful exploitation within the range of possibility.

(2) According to the present arrangements, the Annapolis Iron Company delivers its ore by rail to the Londonderry Iron and Mining Company at Acadia Mines. The two are closely allied financially, and the latter company owns outright the Leckie mine, lately closed down, and several other parcels of ore-bearing

free from phosphorus and remarkably low in sulphur but high in lime and magnesia. Moreover, the Londonderry ore is porous, reducing easily during its descent in the furnace, while the Torbrook ore is dense. It would seem, therefore, that any plan looking to the mixing of these ores should receive consideration, and that any scheme for a new western reduction centre should take into account the presence of the Londonderry iron ore range.

Leaving aside the financial problems engendered by present ownership, a smelter erected either at Parrsboro or Annapolis would fulfil the necessary conditions of situation and availability. In the former case the ore from the Torbrook field would be shipped at Annapolis or Victoria beach; and limestone, in part at least from Windsor on Minas basin—all these being situated on embayments on the Bay of Fundy. The distance from Annapolis by water to Parrsboro is 100 miles; from Vic-



Diagrammatic cross-section of Nictaux-Torbrook basin, on theory of simple synclinal folding

ground. Both companies own both land and ore on some farms, and only the iron ore rights upon others.

The ore is shipped from the property (at present the Wheelock and Martin mines only) to Wilmot, thence via main line of Dominion Atlantic and Intercolonial railways to Acadia Mines.

It would be practicable, at no greater cost, to ship the ore by water from Annapolis or Victoria beach to Mines or the Dominion Iron and Steel Company at the Nova Scotia Steel and Coal Company at Sydney Sydney. In this case the water haul would be approximately 650 miles.

(3) The last possibility is that of a new smelting centre. That the ores of Torbrook and Londonderry well supplement each other is readily seen when it is noted that the former is of good low grade quality, high in phosphorus and in part high in lime, and low in sulphur in most instances; while the latter is especially

torria beach, 84 miles; from Windsor, 30 miles. The coal would come in part from Springhill by a short haul to Parrsboro, as much does at present; and water shipment from the Pictou and Cape Breton fields would be feasible. Should western Cumberland county be developed as a coal field, fuel from the centre of the basin would come by rail with a much shorter haul than from Springhill; and that from the western rim of the basin would be shipped probably from Shulie, which is capable of being converted into a harbour.

For ore from Londonderry a road would have to be built along the north side of Cobequid bay. As a charter has some time since been granted for such a road and survey made, its construction may be looked upon as feasible.

In the case of erection at Annapolis such material as would come direct to Parrsboro by land in the first instance could be shipped by water thence to Annapolis



### History of Previous Operations.

**Early Endeavors.**—The existence of iron ore in the basin appears to have been known very early in the nineteenth century, and a small Catalan forge was set up at Nictaux Falls, in which a few tons of bar-iron were made. In 1825, as related in Part 11, chapter 1, the Annapolis Iron Mining Company was formed, erecting a large smelter on Moose river, in the Village of Clementsport. Part of the ore there treated came from the western part of the Nictaux-Torbrook field, near Nictaux river. Later a charcoal smelter was erected at Nictaux, and the veins of ore explored with some thoroughness. Slag from this furnace may even to-day be found in great abundance in the river bed.

In 1855 an English company mined a shell magnetite in the western part of the field, spoken of locally as the Shell bed, but never demonstrated to be the same as the long Shell bed to the east. At least two openings were used—one close to the furnace at Nictaux Falls, the other about two miles east. Limestone for flux was brought from St. John to Port George, on the Bay of Fundy, ten or eleven miles from the furnace, whence also the pig was shipped. The works closed down about 1860, because of too great cost of production.

**Page and Stearns.**—In 1870 Page and Stearns started to make rail connection between Middleton and Bridgewater, on the south shore of the province. In connection with the promotion of this scheme they opened ore pits at many places west of Nictaux River and as far west as Lawrencetown, six miles from Nictaux, all in magnetite. Some property was acquired, still known as the Stearns property of Cleveland mountain and the Page and Stearns property of Torbrook. Much more of the country was taken under lease, with the intention of development when their railway, the Nictaux and Atlantic, was completed. The scheme came to nothing, however. The railway was later completed as the Nova Scotia Central, and recently taken over as part of the Halifax and Southwestern system.

In all this early work the Leckie vein appears not to have been touched, all interest centering upon the Shell bed and various magnetic fossiliferous beds to the west. In these were made open cut trenches, often of considerable length, especially on the Shell bed from the Fletcher Wheelock farm west. No underground mining was attempted.

**Leckie Mine.**—In 1890 Major R. G. E. Leckie, then manager of the Londonderry Iron Company, took royalty options upon certain iron ore deposits in the eastern part of the district, where since has been located the Leckie mine; and in 1891 operations were started. In 1896 the property became idle, because of closing down at Londonderry and an absence of any other market for the ore. Previously the Leckie ore had gone in part to Londonderry, part to Ferrona.

In 1903 the mine was reopened by the Londonderry Iron and Mining Company, coincidentally with the reorganization of the Acadia mines, running until the summer of 1906, when it became exhausted and was shut down. Evidence will be offered later indicating that, while all the ore obtainable from the old shafts had been extracted, the same horizon may carry more lower down.

**Annapolis Iron Company.**—The Torbrook district has been identified with Londonderry since 1890. Recently the Londonderry interests obtained an option upon a large part of the district; and besides widespread surface prospecting and sinking of numerous

boreholes, developed the beginning of a mine on the Shell bed, on the Fletcher Wheelock property and close to the Torbrook-Nictaux road. During the winter of 1906-07 these options were closed, a new company, called the Annapolis Iron Company, being formed to operate. Much the same financial interests are concerned as in the Londonderry company. Recently underground development has commenced in the Leckie vein of the Martin property, west of the Wheelock mine, with the purpose of making a new mine there.

**Output.**—The beginning of the arrangement to take ore from Torbrook (Leckie mine) to Londonderry dates back to 1889, and in 1890 a shipment is recorded of 1,365 tons; in 1891, 7,273 tons; 1892, 27,114; 1893, 29,839, of which 20,000 went to Londonderry, the remainder to Ferrona; 1894, 21,664, divided between the two furnaces; 1895, 29,940; 1896, 19,944 up to July, when the Leckie mine closed down. It reopened in April, 1903, and in the remainder of the year nearly 5,000 tons were mined. For 1904 no public record was made of the output; in 1905 it was 14,538 tons; in 1906, 27,000.

For the early years, during the life of Nictaux furnace, no adequate records exist.

### General Lithology.

**Series represented.**—The western part of Nova Scotia, south of the Bay of Fundy, is largely underlain by the pre-Cambrian gold-bearing (Meguma) series and its associated igneous rocks. The latter include chiefly granites, of which the main body is a great massif occupying many hundred square miles and forming the northern margin of the main plateau of the province, to a height of 600 to 700 feet. To the north of the granite the sedimentary rocks are topographically much lower, and the escarpment thus formed is called South mountain.

Running along the face and base of this escarpment, intermittently from near Weymouth on the west to the Nictaux river, thence without interruption nearly to the Avon river on the east, are various types of sediments, ranging from the upper group of the pre-Cambrian gold-bearing series (Halifax formation) to the Devonian. In part these form a portion of the highland, or hilly country hardly lower in altitude; in part they are so low as to grade into the flat Triassic topography to the north. All are invaded by the granites or their basic marginal equivalents, which to some extent assume the form of diorites.

**Inglesville district.**—Of these sedimentary areas, the only ones of interest in this connection are (1) the Inglesville district and (2) the Nictaux-Torbrook basin. The first is bounded on the north by the Triassic sediments of the Annapolis valley and on the south by the main granite mass; on the west lies part of the main granite which south of Lawrencetown reaches northward to the Triassic. On the east, at Inglesville, a broad tongue reaches from the main mass of the granite up to the Triassic and cuts this iron area off from the Nictaux district, of which it is a logical extension.

Its rocks are in general similar to those of the eastern basin, and it contains a certain but quite unknown amount of bedded magnetic iron ore. But the country is little prospected, and natural outcrops are few. Nothing in detail is known of its structure, or of most of its iron.

**Eastern areas.**—From the east side of the granite tongue above mentioned sediments stretch without complete interruption for many miles, to the Carboniferous of the Minas basin. The detailed geology of this part



of the country is at present being worked out by the Geological Survey, and it is sufficient to say that the studies to date show a succession of rock series occupying areas that are much elongated parallel with the margin of the granite plateau to the south. It is unnecessary to enumerate these areas, the rocks of which appear to be conformable throughout a single unit, but, in some instances at least, unconformable with those of adjacent areas. Some are regarded as of the same age as those of the Torbrook basin; but thus far no iron ore deposit of importance has been discovered in them.

The limits of the Nictaux-Torbrook basin have already been noted. It appears to include two of the series represented to the east, according to the present views of the Geological Survey. Of these the upper, of Silurian age, contains the iron ore. Paleontological evidence as to age is abundant, and in published references hitherto part at least of the strata have been called lower Devonian.

**Sediments of the basin.**—The stratified rocks of the district include coarse and fine sandstones, and their altered equivalents as quartzites; gray, green, bluish and red shales, and their metamorphic forms possessing a slaty cleavage; and limestones. The last are, in certain instances, ferruginous, passing into hematite and magnetite.

The south side of the basin is everywhere occupied by dark green, gray and black slates. In the eastern portion, the centre and the area north of it present fawn, green, black and gray shales, and many bands of quartzites of various colours. These are all shown well in traverses along Saunders, Messenger, Burns, and Spinney brooks, and in the lower and eastern portion of Black or Torbrook river.

At the extreme west, a complete traverse of the basin can be had upon Nictaux river; and a section of the southern half upon Torbrook river, approximately three-quarters of the distance toward the western end of the district. In both these only the gray and black rocks appear, none of the fawn, light green or very light gray, coming to the surface.

The quartzites have some importance in any attempt to work out structure; as one apparently characteristic bed is found at known distances north of the zone of iron ore on the north side of the basin, and a similar bed is found in places south of the South mountain iron ore deposits. The quartzites in the centre of the basin at the east end are in many instances repetitions. Very coarse sediments are not known in the rocks of this basin.

**Eruptives.**—The general distribution of the granite has already been mentioned. Toward the margin, in places the rock becomes darker and finer, turning to diorite; but this is by no means without exception. In addition to the main mass of intrusives there are many isolated bodies of dark and more or less basic igneous rocks, of medium to fine grain. The number and distribution of these are not known.

Their chief importance in relation to the iron ore deposits consists, first, in the influence which they may have upon the distribution of the latter, second, in the metamorphic effect of the intrusives as a whole upon the hematite. As to the former, it may be said that in at least one place, west of the Leckie mine, an apparent absence of the ore along a line in which it should be found seems best explained as the effect of the presence of a boss of intrinsic rock immediately to the north. On the other hand, to the west on the properties of M. Hoff-

man, Page and Stearns, and Josephine Wheelock, the Shell vein, 80 feet south of the Leckie is not affected. But the Leckie is thin throughout this distance and as far west as beyond the Wheelock mine, becoming good once more on the Edwin Martin property. While the western part of this lean portion of the Leckie is quite far from any boss, it is possible that the depauperization is the effect of the presence of two intrusive masses north of the ore.

**Metamorphism.**—Metamorphism of both dynamic and contact types is shown in most of the field. In the north-eastern portion the bed rocks, and to a certain extent others, lack slaty cleavage; even here, however, the light coloured sandstones have altered to dense quartzites. The southern part of the field has everywhere slaty cleavage in the finer rocks; and this is true wherever in the basin the gray sediments are found without the red strata. In part this is the result of dynamic changes.

However, on the south side of the basin there is a progressive increase in metamorphic effect westward, and inspection of the map shows that there the granite to the south approaches nearer. The western end of the district is all much more altered than the eastern, the slates being harder and the coarser rocks more massive. This appears to be due to increasing proximity of the granite tongue behind Cleveland mountain.

**Ore beds.**—The iron ores of the basin are all of the Clinton type, interbedded with the strata, and all originally hematites. In the east this is still true, both of those on the north side of the basin and of those on the south. Westward all the southern ore deposits and a part of the northern become magnetic; and west of the Bloomington road, between Black and Nictaux rivers, there are no openings upon non-magnetic ore. This appears to indicate that the change from  $\text{Fe}_2\text{O}_3$  to  $\text{Fe}_3\text{O}_4$  is a metamorphic effect depending upon the action of the granites.

This has another bearing. The age of the granites can be shown to be early Devonian. In exerting a metamorphic action upon the iron ore, they stamp the latter as of earlier age.

Clinton ores should possess great continuity on the strike; and in the Torbrook district two beds on the north side and one on the south can be traced for a long distance. Of the former, the Leckie can be identified for 15,000 feet, the Shell bed for 13,300 feet, with a probable extension westward. The South Mountain vein can be identified with moderate probability for 10,000 feet, and with fair possibility of its extension to 19,000 feet.

Little is known of the depth, except in the Leckie mine and in one or two of the calyx drill holes. The former lost the iron ore at 330 feet in the Woodbury shaft, not because of lack of concentration, but from pinching of the walls. This is 200 feet below sea level. The Fletcher Wheelock borehole left the Lean Hematite vein, north of the Leckie, at 382 feet, or slightly below sea level.

The difficulty in tracing the Shell vein westward is due largely to the fact that in this direction there is much repetition of shell ore beds across the strike—a condition which may indicate either a number of separate ore horizons or folding.

### Structure.

The structure of the basin is of especial importance; because here, more perhaps than elsewhere in the province, should a knowledge of this feature aid in mining



development. It is to be regretted that, with all the work put upon the field by various students, there still remain several essential points to be established.

**Previous studies: Simple folding.**—It is unnecessary to expand here upon the stages by which present knowledge of the district has been reached. It is sufficient to say that up to 1905 no serious expression of opinion upon the structure had been made, other than that it is a single large syncline. This appeared obvious as in the north there are certain stratified deposits of hematite and magnetite dipping steeply south-east; and on the south are other beds, possibly identical with the first, dipping steeply north-west. From the first, it seems to have been assumed that the northern and southern beds were the same, and that the apparent structure indicated a single large syncline (see Plate).

The relation of the red beds in the east to the gray beds was not inquired into; although the presence of the former has long been known, because Messenger, Spinney and the other brooks near the county line have been justly celebrated as fossil localities. It is noticeable that, with all the collecting that has been done along these brooks, the rocks have never been divided into paleontological stages, which might perhaps prove a key to a structure most difficult to work out by lithological means.

**Recent studies: multiple folding.**—In 1905 appeared a preliminary description of the basin by Mr. Hugh Fletcher (Sum. Rep. Geol. Surv. Can. for 1904), and a reconnaissance geological map, which was of especial advantage in that it appeared at a time when large financial interests were about to become involved in the district. Both the map and the description of openings, of which by that year there were many, were the first published. It is somewhat unfortunate, however, that some of the descriptions of ore belts, where acquired from statements of other parties rather than from observation, cannot be verified.

Mr. Fletcher's field work in 1905, in the same district, led him to state (Sum. Rep. Geol. Surv. Can. for 1905, p. 120) "The work seems to prove that the rocks lie in several synclines."

Even with the evidence gathered during the field season of 1906, it would be hazardous to state dogmatically that multiple folding has been proved; although borings show the certainty of one subordinate fold south-east of the Leekie mine.

**Hypothesis of pitching synclinorium.**—What the structure traverses of the district and the lithological distribution of the rocks would appear to the present author to indicate are:—

- (1) That the region is one of complex folding, being a part basin.
- (2) That the longitudinal section along the strike of the axes of folds, approximately N. 40° E. (magnetic), shows a pitching of the composite fold as a whole south-westward, the angle of pitch being 10° or less. There is, so far as known, no north-eastward pitch at the south-west end of the field, so that the basin structure is incomplete.
- (3) That the red rocks in the north-east, north and north-west underlie the gray as a whole, coming to the surface in these portions, but not out-cropping in other parts of the field because hidden by the overlying gray rocks.
- (4) That the productive iron ore deposits, although not exclusively confined to the gray rocks, are charac-

teristic of them, and are therefore more abundant toward the south-west.

(5) That transverse sections of the basin exhibit several anticlines and synclines, of which the exact number and the situations of the axes are, however, not completely determined.

(6) That, contrary to expectation, the dominant type of fold in this cross-section is the anticline in the centre of the basin, the synclines being shallower; while on the north-west margin the same condition obtains, and on the south-east margin the synclines are dominant.

This means that in the eastern portion of the district the red rocks reach the surface everywhere except on the southeastern side. In the middle of the field the central rocks are covered by drift; but while the strata on the southeastern margin are exclusively gray, and also near the outcrops of the iron ore on the north-west, beyond the latter and adjacent to the Triassic the red rocks once more appear. In the western half of the basin no red rocks appear in the longest traverses.

(7) That it cannot be determined with certainty whether the South mountain ore beds are equivalents of the Leekie, Shell and Lean Hematite beds on the opposite side of the basin. Certain indications, however, point to this condition, specially their relation to a certain quartzite in both situations.

(8) That the frequency of iron ore occurrences in the western half of the field, in any traverse of the basin, may be due either to duplication of the three known beds by nearly isoclinal folding, or to the presence of a considerable number of ore-bearing strata which have separate origin. The former is as likely as the latter.

Some diagrammatic cross-sections of the basin, upon the hypothesis advanced above, are appended (Plates). They are not to be regarded as having any quantitative value, since all the factors—pitch, number, location and altitude of the subordinate folds—are still more or less in doubt; but they will serve to illustrate the principle.

**Consequences of hypothesis.**—The earlier ideas of structure involved a very deep fold in the ore-bearing rocks, allowing and requiring ultimately deep mining, should the iron ore carry throughout. The work of a few years ago assumed a number of small co-ordinate folds, so that the iron ore should be found repeated several times across the basin, possibly increasing the amount speculatively available and certainly decreasing its depth. It did not, however, account for the lack of ore in the centre of the basin at the east end and its prevalence near Nietaux river.

If the hypothesis advanced above be correct, it will account for the characteristic just mentioned; will indicate the improbability of iron ore in the centre in workable quantities until nearly as far west as where Torbrook river traverses this portion of the field; and will point to the probability of a number of ore occurrences in synclinal folds west of this stream at various points transversely across the basin. Whether these are duplications or successively new occurrences, and whether they, the South mountain and the Leekie, Shell and Lean Hematite beds on the north-west can all be correlated evidence is not yet sufficient to prove.

(To be continued.)



**NOTE AND CIRCULAR ISSUED BY THE DEPARTMENT OF TRADE AND COMMERCE.  
SPECIAL NOTE TO THE PRESS.**

The enclosed circular is being mailed simultaneously to every newspaper and other weekly and monthly publication in Canada, with the hope, in the interests of the development of Canada's export trade, that it will be published free of charge, and also that some editorial comment will be made thereon. The circular will be sent also to the members of all Boards of Trade, Chambers of Commerce and Trade Associations throughout the Dominion.

Nothing of this kind has ever before been attempted in Canada, and it will entail great labour in this Department in indexing this information to make it readily available when required. But it is to be hoped that it can be made the basis of a permanent list which will be immediately available at all times in the advancement of the Foreign Trade and Commerce of Canada.

The Department desires the name of every Exporter from the Atlantic to the Pacific, with a detailed list of the goods they are in a position to sell abroad.

When this information is furnished the Department all the Canadian Trade Commissioners in the various parts of the world will be notified immediately and the same information will be systematically indexed in the United Kingdom, one in France, two in South Africa, one in Mexico, one in the West Indies, two in Australia, one in China, one in Japan, one in Holland, and one in Newfoundland.

F. C. T. O'HARA.

Deputy Minister.

Department of Trade and Commerce.

**EXPORT BUREAU.**

Ottawa, October 1st, 1909.

The Department of Trade and Commerce desires to announce its intention of compiling an Index of Canadian Manufacturers, Exporters, and Producers generally, who desire to extend their trade abroad.

For this purpose the attached form should be executed and forwarded in the enclosed envelope to the Department without delay.

It would assist the Department materially if the details under "Articles Manufactured or Produced" be entered in alphabetical order.

The list compiled by the Department will be given the preference at all times when the names of such Canadian firms are required by intending purchasers abroad.

As the information is received at the Department it will be forwarded to all the Canadian Trade Commissioners in the various parts of the world, and be systematically indexed and be readily available in their respective offices.

Deputy Minister.

**CANADIAN PATENTS.**

The following is a list of patents issued by the Canadian Patent Office on Sept. 28, 1909, relating to Mining and Metallurgy, and furnished by Fetherstonhagh & Co., 5 Elgin street, Ottawa, Russel S. Smart, Resident:—

120773. T. L. Willson, M. M. Haff, Ottawa, Ont., processes for producing calcium silicide, T. L. Willson.

120775. M. D. Porter, Lewiston, N.Y., dehydrating apparatus, W. O. Rowe, R. S. French.

120781. W. J. Ellis, Andrews, North Carolina, Combined boilers and furnaces.

120784. J. Fleming, Lynn, Mass., regulators for poly-phase furnaces, Can. General Elec. Co., Ltd.

120807. H. S. Blackmore, Mount Vernon, N.Y., processes for dissociating fluid salts or compounds by electrolysis.

120817. J. T. Carrick, Johannesburg, Transvaal, preparation of iron compounds.

120852. F. H. Headson, La Fayette, Ind., metallic compounds and processes of making same.

120857. A. C. Higgins, Worcester, Mass., methods of treating illuminous materials.

120857. L. S. Lachman, New York City, processes of electric welding.

120901. H. L. Orr, Georgetown, Wash., ore separators and concentrators.

**THE NEPHELINE AND ASSOCIATED ALKALI SYENITES OF EASTERN ONTARIO.\***

For a number of years two of the most capable geologists connected with our Canadian Survey have been studying an important area of the Archean in Eastern Ontario. Their work has been the most detailed and elaborate yet accomplished by the Survey, and we may hope soon to have in our hands a profound and illuminating volume on the Haliburton region. In the meantime the two maps prepared in connection with the work have been distributed and have proved of great interest, and several scientific papers on special points of the geology have appeared, the most important being the pamphlet mentioned above.

In the paper on Nepheline and Associated Alkali Syenites Dean Adams and Dr. Barlow have prepared what everyone expected from them, a most careful and thorough petrological study of a very interesting group of rocks, a group unique in various ways, such as the constant association of nepheline syenite with crystalline limestone, and its frequent association with corundum.

The paper includes an elaborate study of the minerals occurring in the group of rocks and the petrographical features and chemical composition of the various rock types, the new quantitative classification introduced a few years ago by Iddings, Cross and Washington being made the basis of classification. To old-fashioned petrographers the new names still have a look of strangeness and artificiality, though some reform in rock nomenclature was certainly needed.

From the economic point of view the most interesting feature of the work is the account of the great corundum deposits near Craigmont, probably the most extensive in the world. The beautiful blue sodalite occurring in Dunnannon township and elsewhere is already of some importance as an ornamental stone.

The paper is excellent and there is little to criticise as to form or matter, unless perhaps to suggest that the good pioneer work of Dr. Miller, of the Bureau of Mines, in tracing out the long bands of corundiferous rock should have received a little more emphasis.

One naturally compares the work with that of Brögger on the Scandinavian nepheline rocks, but the two areas are so different in almost every respect that little is to be gained from this. It is a satisfaction to find a paper so finished and of so high a standard coming from Canadian Petrographers.—A. P. Coleman.

\*Trans.—Roy. Soc. Can., 3rd series, 1908-9, Vol. II., Sec. IV. Frank D. Adams and Alfred E. Barlow.



## EXCHANGES.

**The South African Mining Journal, July 3, 1909.**—The Transvaal authorities are proposing to increase death duties in the Transvaal from one per cent., the present rate, to ten per cent. The South African Mining Journal comments caustically upon this. In an editorial headed "How Not to Attract Capital," the Journal predicts that the Transvaal will suffer heavily from this imposition. Instead of sweeping away altogether the estate duty, the Government actually contemplates magnifying this industrial handicap tenfold. . . . In every department this young colony is crying out for more capital. The latest proposal of the Government promises . . . to prove a most effectual deterrent to the oversea investor."

**Electrochemical and Metallurgical Industry, October, 1909.**—Our contemporary, commenting upon the need of a uniform nomenclature for iron and steel, recommends that leading societies in Great Britain, the United States, Germany, Sweden and France each appoint one member of a permanent international committee, each member to be appointed for one year only, so as to guard against too great fixity in the personnel of the committee. The functions of this committee will be to recommend such changes in existing nomenclature as it deems absolutely necessary for guarding against commercial dishonesty, and to recommend suitable and correct names for new commercial products as soon as they appear.

**Mines and Methods, Volume I., No. 1, September, 1909 (Salt Lake City, Utah).**—This is a new venture in technical journalism. Mr. Claude T. Rice is the editor and publisher. Mines and Methods will touch not only upon the subjects implied by its title, but will do its best to see that shareholders in mining corporations get a fair show. Curiously enough, this first number has not one advertisement. Editorially this is explained. Mr. Rice wishes to show the goods first, and then get after the advertiser. Possibly this is a good plan.

Anyway our new contemporary is attractive and instructive. If more room is needed there are several periodicals that can well be spared to make the necessary space.

**The Colliery Guardian, September 24, 1909.**—The Guardian dissects the portion of the second report of the Royal Commission of Mines, that deals with the subject of ventilation. Before a final report is made, much difficulty is expected. The debated point is whether the presence of two per cent. or three per cent. of firedamp is to be taken as the regulation minimum. The mine owners contend that, for practical purposes, a percentage of three per cent. is a proper minimum. The Commission evades the difficulty by recommending that "every reasonable endeavour be made to maintain such a standard of ventilation as to prevent the appearance in any open and readily accessible position of a fully formed 'cap' on the lowered flame of the safety lamp. . . . Enquiries are being made as to the percentage of firedamp that constitutes a fully formed 'cap.'"

The Guardian points out that, while a percentage standard will surely be fixed, the difficulty will be to establish one that is neither too high nor too low. "Just

as a standard timbering distance has not promoted safety, principally because it is usually too liberal in cases of excessive danger, too high a standard of ventilation would lead to a sense of false security and tend to override the faculty of discrimination. On the other hand, too low a standard would be equally objectionable owing to the impossibility of establishing it in practice."

**The Engineering and Mining Journal, October 2, 1909.**—A hot-blast copper smelting furnace, of small capacity, built for mountain transport, and adapted to the needs of the small operator, is described by Mr. P. A. Babb. The New Model hot-blast furnace is made in sizes having capacities ranging from 5 tons to 50 tons, and requiring from 1½ h.p. to 25 h.p. The shipping weight of the smallest size is 2,000 kilograms, that of the largest size 8,000 kilograms.

The only radical change in design is the elimination of tuyeres. Instead of the tuyeres there is a continuous opening of an inch or two in height forming the blast-way into the stack, and situated between the crucible and the stack. The crucible during the operation is set into the wind-box and extended to the blast-way.

**The Mining Journal, September 25, 1909.**—Forty tons of asbestos, valued at £1,600, were raised in the Pilbara gold district, Western Australia, in 1908. But the country is full of promise. A paper by Mr. C. W. Marsh in the current number of the Mining Journal gives a deal of useful facts and figures concerning the asbestos formation at Marble Bar, practically in the geographical centre of Western Australia.

The asbestos occurs here in portions of two greenstone dykes, running north and south. The eastern dyke has the appearance of diabase. The character of the western dyke is obscure. Its freshly fractured surfaces are greenish-black; its weathered surface is red. It is principally along the junction of these two rocks that serpentine rock occurs most persistently.

The richest asbestos ground is that which has been altered most intensely, and the characteristic features of the asbestos have apparently been governed by the character of the containing rock and the changes through which it has passed.

Much of the rock carrying veins of from ⅛ inch to ¾ inch in thickness will average 30 to 40 per cent. asbestos, and reasonably large working areas will average 20 per cent.

Working costs, as compared with those tabulated by Mr. Fritz Cirkel, will be considerably higher than Canadian costs. The climate is more advantageous, but the mineral is of much lower grade than the Quebec asbestos.

**The Mining World, October 2nd, 1909.**—A timely article, entitled "Gold Recovery by Electrolytic Amalgamation," appears in this issue. The writer, Mr. J. H. Jory, compares electrolytic amalgamation with cyanidation. By way of introduction Mr. Jory quotes this paragraph from a recent writer: "The electrochemical system of amalgamation is designed to extract from the sands or pulp all gold not encased. It is an entirely new system, designed to do the work of the ordinary mill-plate, including the treatment of slimes, and at the same time to extract gold that cannot be



saved by the usual mill practice, and that otherwise would require cyanide treatment. All this is done in one inexpensive and continuous operation, requiring practically no more outlay for installation and maintenance than the usual mill-plate. The system also furnishes a method by which black sands, desert deposits and many low-grade propositions can all be profitably worked. The broad claim made is that it will save all gold not encased."

This last claim, of course, is more than can be postulated for the cyanide process. Many minerals either prevent or render problematical the use of cyanide on certain ores.

The electrolytic amalgamating machine of standard size has a capacity of 100 tons per 24 hours. The demonstration machine, now in use in the laboratory of the Noble Metal Recovery Company, at San Francisco, has a capacity of about 6 tons in 24 hours. A very much smaller assay machine has been worked for some time, and has been found entirely reliable for research investigations.

For ores a fineness of from 30 to 150 mesh has been found necessary. For black sands, etc., no further comminution is required.

Examples are cited, covering a variety of different ores, where all or practically all the gold was saved. As in cyanide practice, so here each ore is a law unto itself. But with electrolytic amalgamation, slimes present no difficulty. Indeed it is pointed out that none of the mechanical and chemical limitations inherent to the cyanide process affects the electrolytic method.

**The Engineering Magazine, October, 1909.**—Of special interest to Canadian cement manufacturers is a short article in this number of the Engineering Magazine. Mr. F. Fisher, discussing marl deposits, states that experts and public alike cherish wrong ideas concerning the fitness of marl for making Portland cement. The expert has an unreasonable prejudice against all deposits, while to the public all marl deposits are valuable.

Mr. Fisher, conceding that most marl beds are commercially useless, points out that there are many good deposits neglected because of lack of proper knowledge of what good marl is.

Any marl, if free from sand, will make good cement, if properly handled; but to do so at a profit is a matter of much greater moment. From the cement-maker's point of view, the marl of importance is the heavy and rather granulated solid deposit, in which vegetable life has ceased, leaving a little peaty residue. Such marl is very heavy, carrying but half (or less) of its weight of water, as it is dredged from the bed. The majority of marl deposits, however, do not fulfil these conditions, but are more or less impregnated with living vegetable tissue. Marl, apparently white and in good condition, has been found to carry 85 to 90 per cent. of water.

Taking into consideration the consumption of coal involved in drying marl, the deadline between profit and loss lies at about 50 per cent. of water in the marl. With water at 40 per cent. marl is a cheaper material to use than limestone.

Very many otherwise excellent deposits are absolutely ruined by their contents of sand, either uniformly distributed to the extent of 1 to 2 per cent., or in distinct layers; but so disposed that it is impossible to excavate the marl uncontaminated with more or less sand. This condition is fatal. The sand can neither be removed nor ground to the requisite fineness.

When a lake or marsh can be drained and the material dug "dry," the loss is low. Dredging means a loss of about 50 per cent. on a 6 foot or 10 foot deposit. Where draining is not possible, centrifugal pumps are often used to advantage.

Neglecting to determine the water content and the sand content of marls has thrown the industry into an undeservedly bad position.

## PERSONAL AND GENERAL.

Mr. R. R. Hedley is in Rossland, B.C.

Mr. Eugene Coste has returned from Alberta.

Dr. W. G. Miller visited Gowganda early in October.

Mr. D. G. Drinnan, late superintendent of the collieries of the Crow's Nest Pass Coal Co., was in Toronto recently.

Dr. A. M. Campbell, of Ottawa, has lately inspected several of the old silver mines of Thunder Bay District, including the Beaver.

Mr. Charles Fergie is back in Montreal from northern British Columbia, where he made an arduous journey examining coal prospects.

Mr. Robert Coulthard, formerly of the Crow's Nest Pass Coal Co., has accepted the position of general manager of the Canada West Collieries, Alberta.

Mr. Reginald E. Hore, of Toronto, formerly instructor in the University of Michigan and in the School of Mining, Kingston, Ont., has been appointed instructor in petrography in the Michigan College of Mines, Houghton.

Mr. H. H. Stock has been appointed professor of mining engineering at the University of Illinois. For the past 11 years Mr. Stock has filled the chief editorial chair of Mines and Minerals. His experience of mining is broadly based upon years of work and observation.

Messrs. Bateman & Brown, Cobalt, Ont., announce that they are prepared to undertake the management, examination and development of mining properties in the Cobalt district. The members of the firm are qualified by varied experience in Mexico, the Western States and Canada. Mr. Bateman is engineer for the T. & H. B. Company; and Mr. Brown for the Silver Cross, Belmont and other mines. Cobalt will be the headquarters of the new firm.

Hon. William Templeman, Federal Minister of Mines, has returned to Ottawa after a long tour through the Yukon and Atlin. Mr. Templeman is said to have been greatly impressed with progress made in the Yukon. He states that at the Tantalus Colliery, 40 miles from Dawson, a large generating plant is being erected to supply power direct to the hydraulic plants within a radius of 50 miles.

The following gentlemen were elected to membership at a Council meeting held on the 1st. instant:—

Members—Paul Hammerich, superintendent Robertson Asbestos Mining Co., Thetford Mines, Que.; Albert J. Hewitt, superintendent Beaver Consolidated Mines, Ltd., Cobalt, Ont.; Harry A. Morin, Box 607, Gowganda, Ont.; W. P. D. Pemberton, St. Charles Street, Victoria, B.C.; Wm. P. Williams, West Canadian Collieries, Lille, Alta.

Associate—Andrew Laidlaw, Spokane, Wash., U.S.A.

Student—L. J. Duthie, Cobalt, Ont.



## SPECIAL CORRESPONDENCE

## NOVA SCOTIA.

**Glace Bay.—The U. M. W. A. Strike.**—At this writing the U. M. W. A. strike completes the third month of its ill-starred course, and not even the oldest inhabitant in his most reminiscent moments can remember a more calamitous period in the history of our mining industry. With the exception of the paltry strike at Langan in the very beginning of the coal trade, no serious industrial disturbance has ever occurred at the Cape Breton coal mines, and in the case of the Dominion Coal Company the present unwarranted strike is the only one this company has ever experienced. It may be that the lack of acquaintance of our people with the conditions attending a strike rendered it easier for the agents of the U. M. W. A. to induce them to go light-heartedly into a struggle the true nature of which is only now becoming apparent.

The outputs continue to show the steadily increasing growth which they have maintained since the first days of the strike. The figures for the months of the strike are as follows:—

| Month.              | Total Output. | Average<br>Daily Output. |
|---------------------|---------------|--------------------------|
| July . . . . .      | 136,000       | 4,200                    |
| August . . . . .    | 154,000       | 5,900                    |
| September . . . . . | 180,000       | 7,200                    |

The number of men at work, as indicated by the increased outputs, is steadily being augmented. The company practically ceased importations during September, and a large proportion of the output increase is due to returned strikers. Many men who feel that they have been deceived by the representations of those who brought on this strike and would like to return to work lack as yet the courage to come back, but it is not expected they will hesitate much longer. Most of this class of men would long ago have been back at their work were they not afraid of physical violence from the strikers, and their fear is not unfounded. At the end of September the number of men working for the Coal Company around the mines was roughly 5,000 men, of whom some 3,500 are directly employed at the collieries. The number of men out on strike is between 1,500 and 2,000, probably about 1,700. The United Mine Workers falsely state that the strikers number from 4,000 to 5,000. In the open letter addressed by the U. M. W. A. Executive to President Ross 5,000 is the figure used. To lie successfully it is prudent to make at least some approximation to the truth, or rather the apparent truth, but in claiming five thousand adherents at the mines of the Dominion Coal Company the U. M. W. A. Executive has stretched the credulity of the public beyond the limit of elasticity.

It will be seen from the foregoing figures that there is a great disparity between the numerical strength of the strikers and of the men who are at work, which renders it the more extraordinary that the authorities should not be able to stop the intimidation which is still going on.

The features of the past fortnight have been the open letter, which is previously referred to, and the arrest of the local president of the U. M. W. A. at the instance of the Dominion Coal Company on a charge of criminal libel.

The open letter to Mr. Ross was chiefly remarkable for a statement which read as follows: "Our position (that of the U. M. W. A. Executive) has always been, is now, and will continue to be, that we want the company to receive a committee of its employees to consider grievances and to remove the grievances where possible. That is all the recognition we have asked for." It is the general opinion that the U. M. W. A. International Executive would scarcely spend \$365,000 (this sum is given on the authority of the U. M. W. A.) and be prepared to spend still more for the sake of inducing a Nova Scotian coal

company to "meet a committee of its workmen," more especially as the company in question has been meeting such committees for sixteen years. The *reductio ad absurdum* has rarely been better illustrated than in this lame conclusion to the flaming diatribes of the U. M. W. A. orator, and it was very generally remarked when the letter appeared that the writer had rather weakened than strengthened the case of his employers. The letter was not, however, intended for the enlightenment of the persons who are most interested in the struggle, but is a collection of *ex parte* statements intended to impress the outside public who are not sufficiently familiar with the details of the U. M. W. A. campaign to be able to detect the omissions and perversions of fact of which the letter is chiefly composed.

The arrest and trial of Mr. Daniel MacDougall for criminal libel has been fully detailed in the newspapers, and the continuance of the enquete will doubtless throw a little more light on the methods of the U. M. W. A. It is to be hoped that Messrs. Bousfield and Patterson will respond to the invitation to tell the Canadian courts what they know.

Another interesting feature of the week has been the meeting of the Grand Council of the P. W. A. and the resolutions which were passed referring to the conduct of the U. M. W. A. this summer. The P. W. A. decided to affiliate with the Canadian Federation of Labour, which is the natural outcome of the fratricidal attack which has been made upon them by the American union. The newspapers in Cape Breton were much amused to see that Mr. James Simpson, of the Toronto Star, was not successful in obtaining the position of president of the Trades and Labour Congress, for which he laboured so strenuously when reporting the strike at Glace Bay. Mr. Simpson was exceedingly wrathful when in Glace Bay at the remarks which the local newspapers made about his predilection for the United Mine Workers, and his reports to the Star. The Provincial Workmen's Association passed a resolution stigmatizing Mr. Simpson as a "shameless prevaricator," which was almost unparliamentary. We rather think, however, that the P. W. A. and the C. F. L. will before long be able to laugh at the A. F. L., the U. M. W. A. and all the little Canadians that talk about international unionism.

**The Pirates of Trades Unionism.**—The chief attraction of the U. M. W. A. to the Nova Scotian miner has been that the U. M. W. A. was reputed to be a large, wealthy and strong union, which would enable them more successfully to withstand the forces of capitalism. The U. M. W. A. in its turn has told the Nova Scotian miner that the reason the Canadian capitalist did not approve of the U. M. W. A. was because the capitalist knew these facts, and was afraid the U. M. W. A. by the use of its big stick would force him to disgorge his ill-gotten gains. Every argument adduced against the U. M. W. A. in the Canadian press was traced to the capitalist, and was nullified because it appeared in the "capitalist press"—as our Fourth Estate is usually referred to by the U. M. W. A. agitator, and the workers were impressed with the fact that the capitalist was "scared" of the U. M. W. A.

The capitalist, we are free to admit, was "scared" of the U. M. W. A., not, however, for the reasons given by the walking delegate of that precious organization, but because he saw approaching the herald of discord, of bloodshed and strife, and of attacks on his trade and profits. "Profits" is a word which is *anathema maranatha* to the U. M. W. A., but until the social fabric is readjusted they are necessary if wages are to be paid.

The Canadian capitalist was apprehensive because of the record of the U. M. W. A. in the land of its birth, namely, the United States. There, for the past seven years, the U. M. W. A. has played the part of Captain Kidd. The U. M. W. A. Journal claims "Old Glory" for its flag, but we would suggest the



"Jolly Roger" as a more fitting emblem for a piratical organization which extends in influence by squeezing out smaller unions. The attack which is now being made upon the P. W. A. in Nova Scotia is an oft-played game with the U. M. W. A., and it is amusing to those who know the methods of the U. M. W. A. and who know the way in which the meetings of the Grand Council of the P. W. A. were watched by emissaries from Indianapolis to hear the delegates in Glace Bay speak of being "invited" to Nova Scotia. The invitation given by the U. M. W. A. to anything smaller than itself is similar to the invitation given to the lady who went for a tiger ride in Niger.

The Roosevelt Commission on the Anthracite Strike in the States found that disorder and lawlessness attended the operations of the U. M. W. A., and that an organization whose purposes could only be accomplished by violation of law and order of society had no right to exist. As in Glace Bay, the U. M. W. A. in the anthracite strike objected to the presence of the militia, on which the Commission commented: "The resentment expressed by many persons connected with the strike at the presence of the armed guards and militia of the state does not argue well for the peaceable character or purposes of such persons." Could any words be more applicable to the conditions which exist in Nova Scotia to-day? The president of the Lehigh Coal and Navigation says the U. M. W. A. made not the slightest effort to secure the arrest and conviction of the men guilty of outrages. "On the contrary, it did what it could to shield and defend them." At Glace Bay men guilty of outrages are being defended by lawyers retained by the U. M. W. A. The president of the Delaware and Hudson Company says: "The U. M. W. A. has not in the past, and there is no reason to believe it will in the future hesitate to sacrifice life, liberty, and property to gain its vicious and temporary ends. It denies the right of man to sell his labour in a free market." At Glace Bay the U. M. W. A. has yet to clear its skirts of the sacrifice of life and the destruction of property to gain its vicious and "temporary" ends. How temporary these ends are the Nova Scotian dupe will learn before next spring arrives.

On the record of the U. M. W. A. in its home the Nova Scotian operator decided it was best for himself and everybody else that the U. M. W. A. should not get a footing in this hitherto orderly and strike-free province. On the record of the U. M. W. A. since it came to Nova Scotia it is probable the Canadian public have come to the same conclusion.

One of the most contemptible of the many contemptible policies which the U. M. W. A. has in its arsenal is the way in which it attempts to sow the seeds of discord between the workmen and the management of the coal companies. At Springhill the U. M. W. A. Press Committee has not only attacked the relations of the management with their men, but has also attacked the technical skill and the financial direction of the company. At Glace Bay, as we pointed out in a previous letter, the same tactics have been pursued. The latest scare which the U. M. W. A. has disseminated through the pages of a complaisant organ is that information is to be laid against the coal operators of Nova Scotia as a body charging them with illegal conspiracy to raise the price of coal. This is just what one would expect. From the very first it has been apparent the ultimate aim of the U. M. W. A. campaign was injury to our coal trade. Our chiefest industry is fair game for the U. M. W. A., but what is most surprising is that our own provincial newspapers should join hands with the alien to work destruction on the financial bulwark of Nova Scotian credit. A long time ago we warned the Sydney Post that its endorsement of the U. M. W. A. cause was going to work havoc on the main industry of Glace Bay, and that anything which worked harm to Glace Bay would in the long run work much greater harm to Sydney and its one industry. The balance sheet of the Dominion Iron & Steel Co. for 1909 will show very conclusively what result the

Glace Bay strike is going to have on its earnings. It is almost inconceivable that responsible newspapers should allow the tortuous ways of obscure local politics to lead them into an endorsement of such an unblushing attack on our main industry as the U. M. W. A. has made this summer.

While the onslaught of the U. M. W. A. on Nova Scotia was a long-premeditated one, and would have been made sooner or later, it is questionable whether it could have been brought to a head had not Nova Scotian newspapers helped it along, and it has been an interesting study to watch the skilful way in which the agents of the U. M. W. A. have used a party press to attack Nova Scotia's financial credit, in the name, save the mark, of reform. Politicians are proverbially short-sighted, statesmen seldom, and we are forced to conclude that the crop of politicians in Nova Scotia has choked all statesmanship, else never had men been so purblind as to join hands and help the alien and the pirate. When all is said and done we must congratulate the leaders of the U. M. W. A. on their astuteness and on the manner in which they sized up the exceeding littleness of politics in Nova Scotia.

**Dominion Coal and the North Pole.**—We noticed in the last number of the Journal a dreadful effusion headed "Arctic Amenities." Sydney has seen a good deal of this kind of thing, but we do not remember to have seen any mention of the fact that the "Roosevelt" on her journey north was bunkered with Dominion coal at International Pier. Therefore in advertising their coal in future the Dominion Coal Company may justly claim that "Dominion Coal found the Pole."

## ONTARIO.

**Cobalt.**—The White Reserve Syndicate at Maple Mountain has made a six ton shipment of high-grade ore. At the present time the mine is closed down temporarily. This is not due to the condition of the mine, but to internal troubles among the directors, and also due to a shortage of funds on account of the large expenditures made in making roads, etc. This district will be connected with the Haileybury Road, of which about seventeen miles are in good shape, and it is probable that this winter the ore will be shipped out this way. Work will be started up again about the 1st of November.

The recent discovery of silver on the property of the Red Jacket Mining Co., and also the finds made in the Gillies Limit have extended the silver bearing area of the camp a considerable distance to the south. The main shaft of the property was sunk to a depth of 125 feet on a large calcite vein, and drifts were started from this point. The silver was found in the north drift, where the calcite widened to about 30 inches, carrying smaltite and native silver.

A few days ago work was started on the new concentrator for the Silver Cliff Mine, this making the fourth concentrator that is in the course of construction. The other three are the Temiskaming, Trethewey and Nova Scotia. The mill will have a capacity of about 100 tons per day, and provisions are being made for the installation of a cyanide plant should it be found necessary. The Silver Cliff is worked from tunnels, and has a large tonnage of low grade ore in sight.

A short time ago the Cobalt Lake Mine shipped a 33-ton car of high-grade ore, which will run about 1,000 ounces. The greater portion of this car comes from the vein that was discovered a few months ago. This vein, which was found near the McKinley-Darragh, has now crossed the boundary. A crosscut is being run parallel to the line to catch two of the McKinley-Darragh veins which were worked within a few feet of the Cobalt Lake boundary. The present shipment brings their output for the year to about one hundred tons.

Several new shoots of ore have been found in the vein at the Beaver mine. Considerable work is being done on the 200 foot



level, and from this depth a winze is being sunk an additional fifty feet.

The rise in the stock of the Crown Reserve Mines, which has attracted so much attention of late, is due to the results which have been obtained from their underground workings. The main shaft has been connected with the workings of the 200-foot level, on which a large amount of development has been accomplished. This lower level is in the Keewatin formation, and although the values fell off to some extent, they still carried high values in silver. The veins are more split up, and mining operations are productive of a much larger amount of low grade ore than formerly. There is some talk of putting up a concentrator on the property.

A new vein was discovered on the Gamey lot belonging to the Cobalt Central a few days ago in a trench which is being dug by the contractors who are putting in the town waterworks system. Where discovered it was about four feet in width of calcite carrying low values in silver. No work has been done on this lot for some time.

The work on the new concentrator at the Trethewey Mine is making progress, and in a short time the cement foundations will be completed. The greater portion of the machinery has been ordered, and some of it is already on the road. The capacity of the mill will be about eighty tons a day. There is a large quantity of milling ore on the dumps and in the stopes.

Of the recent work in the main La Rose mine the most important development has been the cutting of the No. 10 vein by a crosscut running north from the MacDonald vein on the first level of the shaft. The No. 10 vein was cut at a depth of 70 feet below the tunnel level, and shows a good width of high-grade ore. Last year the vein above the tunnel level produced 200,000 ounces of silver, and also a large amount of high grade ore is blocked out. The MacDonald vein has been developed for over 300 feet below the tunnel level, and in the past has been one of the main producers of the property. At the Lawson work has been greatly hampered underground on account of the lack of power, and as soon as the air is ready for distribution, operations will be carried on on a much larger scale. The new headframe over the main shaft has been completed, and the ore house will be ready in a couple of weeks. A new shaft is being sunk on the vein found about six weeks ago near the Foster line. This vein is being sunk away from the main shaft, and will be continued to the 100-foot level. At present it has attained a depth of 35 feet. The La Rose Consolidated has been one of the heaviest shippers from the camp, and since the beginning of the year has sent out 4,500 tons. The greater portion of this tonnage comes from only one of their holdings.

On September 27th. the second cyanide plant, which is at the O'Brien mine, started treating the ore. The Moore slime process will be used, and it is estimated that an extraction of 90 per cent. can be made. When running to its full capacity, the mill will put through about 120 tons a day. The introduction of these cyanide plants in the camp is a significant step, and is being watched with a great deal of interest. Many millmen were of the impression that cyaniding could not be worked successfully, but the work recently done would seem to prove the contrary. The idea seems to be now that the cyanide process can be successfully applied for the treatment of the slimes. It is doubtful, however, if the treatment can be used to advantage with the sands. So far as can be ascertained the extraction from the slimes does not amount to over 65 per cent., and if these alone are cyanided, the process ought to be commercially successful.

Last week a deal was put through whereby the Young-O'Brien lot in the Gillies' Limit was purchased for a figure which is said to be about \$250,000. The purchase was made for a Montreal syndicate, and the property consists of seventeen acres. The value of the lot lies in the fact that the best part of the Waldman vein has been traced for a considerable dis-

tance on the surface. Outside of this but little work has been accomplished.

During the past two weeks work has been started on a large number of lots in the Gillies' Limit. The interest that has been displayed is for the most part due to the discoveries on the Waldman and Red Jacket. The shaft of the Waldman has now reached a depth of over 60 feet, and the vein in the bottom carries good values in silver. At the present time the Waldman is leasing air from the Provincial Mine, and will get its power from that source until the new owners take over the property.

A new vein carrying some silver values has been discovered at the 170-foot level of the Hylands Mines.

Progress is being made on the Nipissing Central Railway, which is to connect the towns of Cobalt, Haileybury and New Liskeard. The grading has been practically completed and the rails are being laid. The only thing that is holding up the company at present is the bridge over the T. and N. O. tracks. Some agreement will probably be reached with the railway in a few days, and when that is done the work will be rushed as rapidly as possible.

At the regular meeting of the directors of the La Rose Mining Co. the regular dividend of 3 per cent. with a 1 per cent. bonus was declared, but it is rumored that the next quarterly dividend will be on a much higher basis. The development being carried on at the Lawson property and other mines of the La Rose combination has required a great deal of money, which has come out of the La Rose treasury. In a short while, however, the Lawson will be in a position to ship continuously, and this will aid very materially in the showing made by the La Rose. The University and Princess are also in better shape than they have been for some time.

Native silver has been found in a vein on the 200-ft. level of the Shamrock Mine, which is one of the properties in South Coleman owned by the Jacobs Exploration Company. The development of this property is giving promising results, and several veins that were not located on the 100-ft. level are now being worked at the 200-ft. level. On the vein in which the silver has been found about 200 feet of work has been done. It is about 3 inches in width and carries considerable silver.

It is estimated that the new buildings being erected in Cobalt will total about 150, and have a value of nearly a quarter million dollars. The great majority of these are being erected on the Haileybury broad, that portion of the town which was wiped out by fire several months ago. The land on which these buildings are being put up is owned mainly by the Nipissing Mining Company, and on the principal streets the ground rents amount to about \$1.00 to \$1.25 per foot of frontage a month.

The shaft on the new vein at the Hargraves, which is being sunk near the Drummond boundary line is now down a depth of over 40 ft. At the 40 ft. level a drift was started and at fifteen feet from the shaft ore carrying good values in native silver was encountered.

There is considerable activity in the Miller, Everett and Le Roy Lake districts at the present time. At Everett Lake about 140 men have been employed all summer by the Everett Lake Syndicate on their holdings in that section, and altogether about 60 veins have been discovered. Several of these carried silver at the surface. One vein has been traced for over 600 feet, and averages about 10 inches wide. At Le Roy Lake the Le Roy Lake Syndicate is sinking three shafts, one of which has attained a depth of about 150 feet, and at this point some good silver values were found. A good discovery was also made on the Welch claim, where a vein carrying about 1,000 ounces in silver was located. A small force of men has been engaged in trenching for the Harman McDougall & Ross Syndicate, who own a large acreage to the east of Le Roy Lake, and several promising discoveries have been made. It is understood that during the coming winter this syndicate will carry on their



operations on a much larger scale than formerly. The wagon road from Elk Lake to Gowganda has now reached the Le Roy Lake, and this will aid very materially in opening up the district. Another concern which has been operating very largely around Miller and Everett Lakes is the German Development Co. This company owns seven claims on which they have been working all summer, and on two veins at least silver was found. It is understood that they are going to dispose of their holdings in this section. Things continue to be quiet in Gowganda, and the results on the whole have been rather disappointing. The work done, however, deserves great credit considering the great disadvantages under which the companies are labouring. The enormous price of supplies has in many cases prohibited the smaller operators from working their claims. During the coming winter, when the Elk Lake to Gowganda road will be in good shape, this section will receive a great deal more attention, as the transportation facilities will be so much better. Many good discoveries have been made this summer on the properties round Gowganda, but the district is still suffering from the effects of the boom of last winter. There is no danger of a repetition of this, however, during the coming season, and operations will be carried on in a much more conservative manner. The underground workings at the Boyd-Gordon have given very encouraging results, and several very fine veins have also been discovered on the Mann. The Blackburn, however, continues to be the best mine in the whole of this section.

Dr. Milton Hersey, who was the first man to discover silver in the Cobalt ores, has been in the camp some time examining the Pierce lots in the Gillies Limit. He has purchased a half interest in this. Dr. Hersey is much impressed with the recent discoveries in that section, and gives it as his opinion that careful prospecting will widen materially the silver bearing area from its present limits.

A good deal of interest has been centred on the Temiskaming and Hudson Bay Mining Co., which recently formed the Hudson Bay Mines Ltd. with a capital of three and a half million dollars, to take over the Coleman Township properties. At the annual meeting held recently the transfer of the properties was formally announced. The number of the directors of the company was reduced from eleven to seven, and it was also decided to erect a concentrator. The report for the fiscal year ending August 31st. showed that a total of 2,400 per cent. in dividends had been paid. This amounted to a disbursement of \$186,264.00. During the year a total of 954,000 ounces of silver was produced. Recent development on this property has given very encouraging results, and new veins have been discovered on three of the levels. It is the intention to sink a winze at a junction of two of the main veins near the Nipissing boundary on the 200-ft. or lowest level of the mine. A small force of men has been engaged in trenching on the southern lots near the Gillies Limit, and several veins have been found. During the coming winter prospect shafts will probably be sunk on some of these.

Mining operations have been commenced on the White River property, which lies to the west of the Farah. It was originally tied up in the same litigation as the Hargraves, but a short time ago a company known as the Reliance Silver Mining Co., with a capital of \$1,500,000, was formed to work it. The management is practically the same as the Hargraves. A small force of men has been engaged in surface prospecting since June, but no buildings have as yet been erected. To the west of the Kerr Lake road a vein carrying considerable smaltite has been traced for 400 feet, and on this vein a shaft will shortly be started. Several other good leads have also been located on the surface.

Underground operations at the Silver Bar have been suspended, and the men put to work trenching the surface.

The Cobalt Powder Co., with a capital of \$40,000.00, has been formed to establish a plant for the manufacture of dynamite at Martineau Bay on Lake Temiskaming. Straight dynamite will be manufactured, and the capacity of the plant will be about two tons per day.

At the meeting of the directors of the Cobalt Central, held a short time ago in New York, the quarterly dividend was passed. It is stated that the reason for doing so is that the capacity of the mill is to be increased from 80 to 120 tons per day. This will necessitate an expenditure of about thirty thousand dollars, and had the dividend been declared, the company would not have had sufficient funds on hand to make the addition. Up to date this company has paid 4 per cent., aggregating \$188,460.00.

The shaft of the Eastbourn Mine is down 116 feet, and at the 100-ft. level a station is being cut. One of the best finds in the South Lorraine district since the Keely and Wetlanffer were discovered was made a few days ago on the property known as R. L. 470, which is located about half a mile north of the Keely. The vein was found on the surface, and has now been traced for about 300 feet. In places it shows considerable silver. The formation of this claim is diabase and keewatin.

The fever situation still causes considerable uneasiness, and the epidemic does not seem to be abating to any appreciable extent. Large hospital tents have been erected on the property of the Coniagas, and the town has also put up several on the Haileybury Road. In the hospital which is under the direction of the Red Cross organization there are at present about 170 patients. Besides these there are a large number in various parts of the town, and in the town hospital. Large numbers have also left the town for hospitals down the line.

#### BRITISH COLUMBIA.

**Roseland.**—More or less activity is displayed about the Le Roi mine just now, there being seventy or eighty men in all working about the property. The diamond drill exploration is going ahead as fast as three machines can drive the holes and there is considerable other work being done, including a little stoping. It has been stated that when the storage space at the mine has been filled with the ore brought to the surface, it is likely that shipments will be made. If this is done it will be almost sure in a short while to lead up to the operation of a part of the company's smelting plant at Northport.

There is so much work going on at the Centre Star group of the Consolidated Co. that only the most important of it attracts any attention. On the Enterprise claim of the group a few days ago a body of good-looking ore was pierced by the diamond drill at a depth of approximately one hundred feet. The diamond drill work is to be continued on the property of the company in that section for some time before work of a more permanent and expensive character is undertaken. Another good body of ore was recently opened up below the 1600-foot level of the Centre Star mine and this is now being approached by a winze for the purpose of more thoroughly working it. The Company's shipments are averaging 3,900 to 4,000 tons per week to the Trail smelter right along. While it is not likely these shipments will be decreased any, yet they will not be increased much until a better price for copper prevails.

The shaft on the Josie property of the Le Roi 2, Ltd., is now down to the 1,120 ft. level, having been sunk 220 feet since the work was started about July 1st. The company is not shipping very heavily, although fair shipments are being maintained. Considerable good ore has been located in the deeper workings which the new shaft will open up and when this ore is available and the extra work off its hands it is thought the company will augment its ore shipments to quite an extent.

A five-drill compressor has been put in and started to work at the Inland Empire mine. The shaft is to be deepened from the 225 ft. to the 375 ft. level.



**The Boundary.**—While the plans of the British Columbia Copper-New Dominion relations have been somewhat slow in unfolding, still things are gradually coming to a focus. The fortunes of these two companies have been drawn so closely together by recent events that it does not seem amiss to link their names together, especially when it is known that plans are under way for a merger. One thing seems to have been settled and that is that the mines of the New Dominion Copper Co. are to be worked at an early date and that the product of these mines will be smelted and converted to blister copper at the smelter of the B. C. Copper Co. at Greenwood. This, of course, will mean the enlarging of the B. C. Copper Co. smelter, for with the plans that this concern has in view for its own interests, all or more than all of its present smelter capacity would very likely have been used. While it would be preferable, no doubt, to some of the men interested, to see the Dominion Copper smelter at work, still, there are times when corporations, like individuals, have to make the best of a bad state of affairs, and this is what the New Dominion Co. has got to do today. The Boundary Falls smelter is a white elephant on its hands, on which the interest on investment, depreciation, and other fixed charges are quite heavy, but little or nothing would be gained by starting work there under present conditions, while on the other hand there would be a loss on the ore treated, when compared with the treatment rate that can be secured from the B. C. Copper Co., which company has always had to convert the Dominion copper matte, anyway, as well as marketing it, the charge therefor being about three cents per pound. In passing it might be of interest to state that in order that a profit be made from New Dominion ore at present figures, the mining costs will have to be kept under \$1.25 per ton; smelting charges approximately \$1.35; converting, refining and selling at under 50c per ton, or a total of \$3.10. The result of these figures would be eleven or twelve cent copper, and when it is known that the B. C. Copper Co. is making copper at present at from nine to ten cents, it may be seen that under normal conditions a profit of 40c to 45c per ton should be made on the ore from the above mentioned mines.

Among other recent acquirements the B. C. Copper Co. has taken a bond on seven or eight groups of mineral claims in the Kamloops mining district; these comprise in all about thirty-three claims. Among the different properties acquired may be named the Bonanza group, Kimberley, Rising Sun, Giantess, Laura, Maxim, Esperanza, etc. This is an important move for Kamloops camp, for if the diamond drill work which the Copper Co. is about to do results satisfactorily, then there is a good likelihood of the Kamloops smelter question being settled by the establishment of such a plant.

It is said that the entire capitalization of the New Dominion Copper Co., 250,000 shares of a par value of \$5, has been issued, and in addition there will be outstanding some \$500,000 in bonds. This should place the company in a splendid condition, financially. The dissenting shareholders are still hammering away at their forlorn hope and have now secured an order from the courts for an examination of the books of the old Dominion Copper Co., intimating that it is their belief that the old company was deliberately wrecked. One of the Vancouver account-

ing firms is now working on the books at the Company's mine offices.

It is claimed that the B. C. Copper Co. is holding nearly two million pounds of copper for better prices. Some of the local mining men, however, do not look for a very great rise in copper for some time to come; for, even should the price strengthen a little there are many of the big producers ready to almost double their outputs, which would soon flood the market again, and lower the price.

**Nelson District.**—Preparations are now under way for the re-opening, on a substantial scale, of the Slocan Star mine, which has been trammelled for some years past by a costly litigation. A new and rich ore body was not long ago opened up on the property.

It is also rumored that the Sullivan group of lead-zinc mines, near Kimberley, will be opened up again soon. This is one of the largest properties in the Kootenay district of its kind. It is very probable that the smelter will also be gone over and put into operation. The whole property was recently acquired by the Fort Steel Mining and Smelting Co., said to be a subsidiary company to the Federal Mining and Smelting Co., of the United States, which company held a majority of the bonds of the old Sullivan company.

Shipments of ore and concentrates from the Highland-Buckeye property continue at the rate of about 25 tons per week. The shipments will be considerably increased as soon as the new air compressing and rock drilling plant has been installed.

Work at the Mother Lode and Yankee Girl mines, Sheep Creek and Ymir districts have reached a stage where an increase of plant is necessary and it is likely that such plants will be installed in the near future and the shipments from the mines increased. The same may be said of the Fife Mines, near Fife, B.C. Things are very active with the smaller mines and the outlook is promising.

**Vancouver.**—A new concern has been organized in Victoria for the taking up and developing of promising mineral prospects. This company will be known as the Pacific Metals Co., with a capital of \$250,000. W. M. Brewer, who recently resigned from the service of the Tyee Copper Co., is president; J. L. Parker, manager.

Those who have their eyes on the Portland Canal mining district are predicting busy times for the mines there. The Portland Canal Mining Co. is getting in its tramway and concentrator and may soon be ordering further additions to its plant. The Red Cliffe Co. is also preparing for an active campaign. Properties recently bonded include the Victor, Ajax, Ben Bolt, the McKay and other mineral claims. The figures for the Ajax and Ben Bolt were over \$100,000, while it is stated that big prices were paid for the other claims named.

The engineers of the Short Line Railway of Portland Canal are on the ground running their surveys.

All arrangements have been made for the opening up of the coal property of the Vermillion Forks Mining and Development Co. at Princeton. Mr. Charles Graham has arrived on the ground to superintend the work. Among other things a new tipple is to be constructed.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Halifax, N.S., Oct. 9.**—The Dominion Coal Company now has ten collieries producing, No. 4 being the latest addition. This is one of the new collieries in the Victoria Langan district. The average output of 8,000 tons a day is now being easily maintained.

A large number of workmen from Newfoundland reached Glace Bay yesterday. Twenty-five expert Bohemian long-wall miners arrived yesterday at Reserve Mines, where they will be employed in the Emery seam. Other experienced men are coming every day.

About one hundred and seventy-five eviction cases have been

heard before Judge Finlayson since the beginning of the strike. Judgment in favour of the company has been given in about one hundred and fifteen cases. About thirty-five cases have been won by the men. In the remainder judgment has been reserved.

The output yesterday was a few tons over 9,000, and Thursday the output was 8,256 tons.

#### QUEBEC.

Sherbrooke, Que., Oct. 8.—(Special.)—Mining property and plant of Asbestos Mining and Manufacturing Company in liquidation in county of Wolfe, was sold by auction yesterday to E. Florence, of Providence, R.I., for \$55,000.

#### ONTARIO.

Sudbury.—The Scadding mine, east side of Wahnapiatae Lake, has been pumped out and sampled by a mining engineer of excellent reputation. The results are understood to be encouraging and further development will be undertaken. The drawback to the property is its inaccessibility. If the railway for which some townsmen applied for a charter were constructed large shipments from this and other mines along the projected line, would now have been yielding business and prosperity to this district.

The Dominion Nickel Copper Co., Limited, has a force of about 100 men at work putting in a spur line from the Canadian Northern Railway to its nickel property. The spur will be about four miles in length.

Cobalt.—The Cobalt Station Mining Company has made arrangements with the T. and N. O. Railway Commission whereby the company will be permitted to sink two shafts in the property. All difficulties as to railway track space have been smoothed away. It is proposed to sink each shaft 100 feet and then drift on to the veins.

Sault Ste. Marie.—The Bessemer, open-hearth, blooming, and rail-mills of the Algoma Steel Company opened on Monday, Oct. 4th.

Port Arthur.—Mr. J. Dix Fraser, general manager of the Atikokan Iron Co., states that there is an excellent market for their pig iron. Mr. Fraser expects to ship about 7,000 tons before navigation closes.

#### BRITISH COLUMBIA.

Sheep Creek.—An important strike is announced from the Nugget mine. A four foot vein has been encountered on the fourth level.

Greenwood.—The B. C. Copper Company blew in its third furnace on September 30th. This brings its total smelter capacity up to about 2,000 tons per day. The Oro Denord mine has resumed shipments.

Vancouver.—During the visit of the Hon. Mr. Templeman to Vancouver, late in September, he was waited upon by a delegation consisting of Messrs. Irving, Pratt and Whittier, representing the zinc industry of the province. It was suggested that tests of zinc-bearing ores be made under government auspices. The Minister promised to present the case to his colleagues at Ottawa.

## MINING NEWS OF THE WORLD.

#### GREAT BRITAIN.

In answer to an interrogation from a member, Mr. Lloyd-George asserted recently that the new mineral taxes will apply to clay used in the manufacture of bricks.

In the opinion of the London and West Country Chamber of mines, the new tax on mining royalties will tend to discourage Cornish mining. The new burden will fall, it is believed, not upon the landlords, but upon the parties working the mines.

At the colliery of the Lochgelly Iron and Coal Company, near Dunfermline, Scotland, a sudden inrush of water from an old working imperilled the lives of 300 miners. No lives were lost.

#### EUROPE.

##### Austria.

Vienna.—The Minister of Public Works has received from the mines at Sankt Joachimstal ten grammes of radium. This is the entire output over a period of eighteen months. Its money value is placed in the thousands of pounds.

It appears that the various zinc concerns making up the proposed new European zinc trust are arranged into two principal groups. The first group comprises 18 concerns, principally the zinc works of Upper Silesia and Westphalia, certain Austrian concerns, and several Belgian works. This group is organized as a German company designated as Zinc Hussen Verband. In

Silesia the Heritier George van Geische Company has remained outside the syndicate, although in many ways closely associated with it. The production of the first group has been limited for 1909 to 255,086 metric tons, and for 1910 to 264,232 metric tons. The second group comprises the zinc works mainly located in Belgium, notably the Vielle Montagne Company. The production for this group is limited for 1909 to 174,519 metric tons, and for 1910 to 175,919 metric tons.

##### Turkey.

The Ministry of Agriculture, Mines and Forests at Constantinople has decided to entrust to private enterprise the further exploitation of the Arghana copper mines in the Vilayet of Diarbekir. A concession for the term of sixty years will be granted for this purpose to an Ottoman company, which is prepared to undertake the mining and reduction of the ore and the transportation and sale of the copper extracted. Smelting works will have to be built on the plateau of Arghana Sou (sources of the Tigris), about 1½ miles from the principal mines. Sufficient capital is required for putting the mines in better working order and for needed smelters and for the generation of electric power from the waterfalls. The company must be in a position to exploit the mines to the fullest advantage, according to the latest improved methods, so as to cover also lower-grade ores hitherto neglected. The Government leaves the disposal of the output altogether to the company, but reserves to itself the prior right to enough copper to satisfy its own needs, for which it will pay at current prices. Certain rebates having been allowed, the net



profit is to be divided between the Government and the company. Every applicant must deposit the sum of \$12,000 as a token of good faith. All deposits will be returned except to the concern which secures the concession and which is governed by special stipulations. Proper evidence of the applicants' financial responsibility must be filed with the applications. On its part the Government pledges itself to facilitate the operations of the company. The latter obtains, free of cost, the use of the necessary lands and waters. With the exception of the higher personnel (managers, engineers, clerks, etc.), the employees must be Ottoman subjects, and the Government, as a silent partner, retains the necessary measure of control of the management of the business. Applications will be received by the Ministry, in sealed envelopes, up to April 15, 1910. This delay will enable interested parties to visit and examine the mines in person.

#### AFRICA.

##### South Africa.

Johannesburg.—The Coal Association has tendered the rock-bottom price of 3s 6d per ton for supply to the Cape Railways, as an act of reprisal against the Witbank Colliery for declining to join the combine against competition.

The Roberts Victor Diamond Company has just accomplished a record in sinking, 267 feet having been sunk in a month in the new shaft now being put down outside the mine to reach the blue ground, which will enable the mine to be worked on a much larger scale.

The Transvaal Consolidated Land Company made a profit of £8,000 for August out of its Groenfontein tin mine in the Waterberg district. It is contemplated erecting additional plant, when the profits are estimated to reach £25,000 monthly.

Mr. Sam Evans, chairman of the New Modderfontein Gold Mining Company, at the annual meeting stated that companies crushing over 40,000 tons a month were able to operate at 7s 7d per ton less than those crushing below 10,000 tons a month. This is certainly a strong point in favour of the large amalgamations which are at present so popular on the Rand. The pioneer in these amalgamations was the East Rand Proprietary, whose results since amalgamation have fully justified the adoption of his plan. It will be recollected that, prior to amalgamation, the Comet, Driefontein, Angelo and Cason gave at one time or another very variable returns, but the advantage of amalgamation provides against these fluctuations by permitting ore to be drawn from any of the mines when a poor zone is encountered. This holds good in all the other amalgamations, and will give a steadiness to profits otherwise unattainable. For instance, the Robinson Deep is at present in one of these poor zones, due to its being unable to raise ore from the richer section of the mine in the dip of the Robinson Central Deep. An amalgamation in his case with the Booysen's Estate, at present being discussed, would strengthen the Robinson Deep Company, and make for better returns and profits.

##### Nigeria.

The Nigeria Bitumen Corporation, Limited, operating in the Lagos Colony, British West Africa, has struck oil in large quantities. On borehole No. 5, water has broken in. But no permanent harm has been wrought. The discovery has caused quite a stir in London.

#### AUSTRALIA.

For the quarter ending June 30th, 1909, Queensland produced tungsten concentrates to the value of £7,042, and molybdenite worth £1,892.

#### INDIA.

U. S. Vice-Consul-General Charles B. Perry, of Calcutta, reports that while manganese is one of the advancing industries of India, the trade has received a setback, the quantity exported falling from 42,570 tons in fiscal year 1907-8 to 24,968 tons in 1908-9, while the value declined from \$254,329 to \$156,763. These results are believed to be due to a revival of the Russian manganese industry, which had received a severe check owing to the troubles in that country. The exports to the United Kingdom in 1908-9 were less than one-half those of the preceding year, those to Holland ceased altogether, while those to Belgium, however, increased. The United States took only a small quantity of the ore, but even then it was an increase on that taken in 1907-8.

#### UNITED STATES.

##### Pennsylvania.

The proposed merger of independent coking interests of the Connellsville region has been abandoned for the present. If the capital for backing the merger had been ready when the announcement of the plans was made and the plans had been hurried it is believed it would have been formed. As at first proposed, the merger would have required \$60,000,000. It was proposed to take over the holdings on a cash basis, but this later was abandoned and a proposition was made to the operators to accept part cash and the remainder in stocks and bonds. The latter proposition was not well received. Companies that would have sold on a cash basis refused to consider the other proposition. Coke now commands from 50 to 75 per cent. more than it did last spring when the consolidation movement was started, and the demand is constantly increasing, as is also the production.

##### Alaska.

Nome.—Although the season of 1909 has been one of the driest on record, the shipments of placer gold from Nome will fall not more than 30 per cent. below those for 1908. Shipments during the spring were heavy; but scarcity of water in the ditches and streams traversing the gravel slopes south and east of the Kigluik Mountains has cut down the output for the remainder of the season.

## Company Notes.

The annual report of the Granby Mining, Smelting & Power Company, Limited, for the year ended June 30th. shows net profits of \$681,135, an increase over 1908 of \$74,613.

The payment of dividends and bonuses to employees totalling \$270,000, left a balance of \$411,135, which compares with last year's deficit of \$91,578, the item of dividends and bonuses in that year having been \$502,713 in excess of those paid this year. There was charged \$167,628 for interest, depreciation, etc., \$61,371 less than last year, leaving a surplus of \$243,507. This, added to the previous surplus of \$2,455,181, left a total surplus of \$2,698,688.

The prices realized for both copper and silver were smaller than in the previous year, copper bringing 13.22 cents per pound on the average, as compared with 13.33, and silver 51.25 cents per ounce, as against 56.25 last year.

The annual report of the Kerr Lake Mining Company for the year ending on August 31st. shows a total income of \$1,386,544, against \$790,484 last year, an increase of \$596,000.

The total net surplus is \$1,129,047, against \$484,537.

The total production of silver was 2,668,648 ounces produced from 1,072 tons of ore (average contents per ton 2,489 ounces) and 600,000 pounds of skimmings. The gross value of this production is, at 50c an ounce, \$1,334,324.

The report says that the amount of cash on hand, together with the ore shipped and unsettled for, is sufficient to pay dividends for the coming year, and that the company's ore reserve will insure dividends at the present rate for a number of years.

#### BRITISH COLUMBIA SYNDICATE.

The report of the British Columbia (Rossland and Slocan) Syndicate, Ltd., for the year 1908, to be presented at the meeting on 5th. proximo, states that the mining claims and other interests held by the company remain about the same as at 31st. December, 1907. The company retains its holding of approximately two-thirds of the issued capital of Snowshoe Gold and Copper Mines, Ltd., and it is hoped that during 1910 that company will be entirely freed from liability and its shares be a profitable

asset of this company. Work on the Snowshoe mine was resumed in September, 1903, and continuous shipments of some 11,000 tons per month have been made since that date, fair profits being earned. The directors have carried on negotiations with various parties with a view to making satisfactory arrangements for the reopening of the Velvet-Portland property, upon which this company has a debenture and option of purchase, but so far it has not been possible to bring these to a satisfactory issue. Negotiations are, however, still in progress in another source. The accounts show an increase of £1,163 in the debit balance on profit and loss account after allowing for interest on bank loan, taxes on properties and other expenses in London and British Columbia.

#### RIGHT-OF-WAY DIVIDEND.

A quarterly dividend of 6 per cent. for the three months ending September 30th, has been declared on the stock of the Right of Way Mining Company. The dividend is payable to holders of record of September 25, and will be paid October 1st. Book closed from Sept. 27 to 30 inclusive.

## STATISTICS AND RETURNS.

#### COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt Camp for the week ending Sept. 25, and those from Jan. 1, 1909, to date:

|                    | Sept. 25. Since Jan. 1. |             |
|--------------------|-------------------------|-------------|
|                    | Ore in lbs.             | Ore in lbs. |
| Buffalo            | 57,110                  | 889,778     |
| Carnegie           | 63,410                  | 63,410      |
| Chambers - Ferland | 961,010                 | 961,010     |
| City of Cobalt     | 1,042,522               | 1,042,522   |
| Cobalt Central     | 40,610                  | 640,754     |
| Cobalt Lake        | 61,380                  | 141,340     |
| Coniagas           | 62,530                  | 1,216,015   |
| Crown Reserve      | 187,300                 | 4,683,379   |
| Drummond           | 992,100                 | 992,100     |
| Foster             | .....                   | .....       |
| Kerr Lake          | 62,020                  | 1,704,226   |
| King Edward        | 183,740                 | 183,740     |
| La Rose            | 195,010                 | 9,363,443   |
| Little Nipissing   | .....                   | .....       |
| McKinley Dar.      | 86,140                  | 1,512,246   |
| Nipissing          | 62,430                  | 9,865,783   |
| Nova Scotia        | 480,810                 | 480,810     |
| Nancy Helen        | 41,300                  | 124,700     |
| Peterson Lake      | 324,040                 | 324,040     |
| O'Brien            | 1,959,512               | 1,959,512   |
| Right of Way       | 117,950                 | 2,272,841   |
| Provincial         | .....                   | .....       |
| Silver Leaf        | .....                   | .....       |
| Silver Queen       | 598,395                 | 598,395     |
| Silver Cliff       | 60,000                  | 183,820     |
| Temiskaming        | 1,566,060               | 1,566,060   |
| Trethewey          | 1,485,698               | 1,485,698   |
| T. & H. B.         | 1,106,260               | 1,106,260   |
| Watts              | .....                   | .....       |
| Muggley Cons.      | 72,900                  | 72,900      |

Ore shipments to Sept. 25 from Jan. 1 are 43,434,872 pounds, or 21,717 tons.

Total shipments for week ending Sept. 25 are 1,033,780, or 615 tons.

#### COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending Oct. 2, and those from Jan. 1, 1909, to date:—

|                  | Oct. 2. Since Jan. 1. |             |
|------------------|-----------------------|-------------|
|                  | Ore in lbs.           | Ore in lbs. |
| Buffalo          | 57,110                | 889,778     |
| Carnegie         | 63,410                | 63,410      |
| Chambers-Ferland | 961,010               | 961,010     |
| City of Cobalt   | 1,042,522             | 1,042,522   |
| Cobalt Central   | 640,754               | 640,754     |
| Cobalt Lake      | 141,340               | 141,340     |
| Coniagas         | 1,216,015             | 1,216,015   |
| Crown Reserve    | 125,095               | 4,808,474   |
| Drummond         | 992,100               | 992,100     |
| Foster           | .....                 | .....       |
| Kerr Lake        | 1,704,226             | 1,704,226   |
| King Edward      | 183,740               | 183,740     |
| La Rose          | 450,803               | 9,814,246   |
| Little Nipissing | .....                 | .....       |
| McKinley Dar.    | 41,472                | 1,553,718   |
| Nipissing        | 67,721                | 9,933,504   |
| Nova Scotia      | 480,810               | 480,810     |
| Nancy Helen      | 124,700               | 124,700     |
| Peterson Lake    | 324,040               | 324,040     |
| O'Brien          | 192,095               | 2,151,607   |
| Right-of-Way     | 63,294                | 2,336,135   |
| Provincial       | .....                 | .....       |
| Silver Leaf      | .....                 | .....       |
| Silver Queen     | 598,395               | 598,395     |
| Silver Cliff     | 183,820               | 183,820     |
| Temiskaming      | 1,566,060             | 1,566,060   |
| Trethewey        | 128,000               | 1,106,260   |
| T. & H. B.       | 1,106,260             | 1,106,260   |
| Watts            | .....                 | .....       |
| Muggley Cons.    | 72,900                | 72,900      |

Ore shipments to Oct. 2 from Jan. 1 are 44,503,262 pounds or 22,251 tons.

Total shipments for week ending Oct. 1, are 1,068,480 pounds or 534 tons.



## BRITISH COLUMBIA ORE SHIPMENTS.

| Boundary—         | Week Ending<br>Sept. 25. | Year.     |
|-------------------|--------------------------|-----------|
| Granby .....      | 212                      | 719,908   |
| Snowshoe .....    | 433                      | 103,728   |
| Mother Lode ..... | 800                      | 192,380   |
| Other mines ..... | .....                    | 2,125     |
| Total .....       | 1,445                    | 1,018,141 |

| Rossland—                  | Week. | Year.   |
|----------------------------|-------|---------|
| Centre Star .....          | 225   | 129,291 |
| Le Roi No. 2 .....         | 613   | 23,204  |
| Le Roi No. 2, milled ..... | 260   | 9,720   |
| Other mines .....          | ..... | 9,561   |
| Total .....                | 1,098 | 171,776 |

| Slocan—                       | Week.  | Year.     |
|-------------------------------|--------|-----------|
| Kootenay Queen, milled .....  | 420    | 15,750    |
| Granite-Poorman, milled ..... | 250    | 9,350     |
| Whitewater Deep, milled ..... | 700    | 26,400    |
| Kootenay Belle, milled .....  | 70     | 2,630     |
| Second Relief, milled .....   | 145    | 5,440     |
| Nugget, milled .....          | 110    | 4,130     |
| Bluebell, milled .....        | 900    | 33,800    |
| St. Eugene .....              | 297    | 15,599    |
| Emerald .....                 | 31     | 890       |
| Queen .....                   | 29     | 497       |
| Yankee Girl .....             | 111    | 10,909    |
| North Star .....              | 131    | 1,670     |
| Cork .....                    | 22     | 319       |
| Rambler-Cariboo .....         | 63     | 785       |
| Blue Bell .....               | 165    | 3,749     |
| Silver Cup .....              | 100    | 1,045     |
| Ottawa .....                  | 120    | 356       |
| Whitewater .....              | 20     | 927       |
| Other mines .....             | .....  | 14,290    |
| Total .....                   | 3,684  | 139,545   |
| Grand totals .....            | 38,227 | 1,329,462 |

## SMELTER RECEIPTS.

|                    | Week.  | Year.     |
|--------------------|--------|-----------|
| Granby .....       | 18,212 | 720,358   |
| B. C. Copper ..... | 7,800  | 193,863   |
| Consolidated ..... | 9,360  | 296,073   |
| Le Roi .....       | .....  | 12,761    |
| Total .....        | 35,372 | 1,223,055 |

## B. C. ORE SHIPMENTS.

| Boundary—         | Week Ending<br>Oct. 2. | Year.     |
|-------------------|------------------------|-----------|
| Granby .....      | 18,985                 | 738,893   |
| Mother Lode ..... | 4,834                  | 108,562   |
| Snowshoe .....    | 8,800                  | 201,180   |
| Oro Denoro .....  | 400                    | 1,883     |
| Sally .....       | 22                     | 122       |
| Other mines ..... | .....                  | 542       |
| Total .....       | 33,041                 | 1,051,182 |

| Rossland—                  | Week. | Year.   |
|----------------------------|-------|---------|
| Centre Star .....          | 2,943 | 132,234 |
| Le Roi No. 2 .....         | 487   | 23,691  |
| Le Roi No. 2, milled ..... | 260   | 9,980   |
| Other mines .....          | ..... | 9,561   |
| Total .....                | 3,690 | 175,466 |

| Slocan-Kootenay—              | Week. | Year.   |
|-------------------------------|-------|---------|
| Queen, milled .....           | 420   | 16,170  |
| Granite-Poorman, milled ..... | 250   | 9,600   |
| Whitewater Deep, milled ..... | 700   | 27,100  |
| Kootenay Belle, milled .....  | 70    | 2,700   |
| Second Relief, milled .....   | 145   | 5,585   |
| Nugget, milled .....          | 110   | 4,240   |
| Blue Bell, milled .....       | 900   | 34,700  |
| Cork .....                    | 44    | 363     |
| Yankee Girl .....             | 106   | 2,015   |
| Emerald .....                 | 39    | 919     |
| Queen .....                   | 27    | 524     |
| Rambler-Cariboo .....         | 119   | 803     |
| Whitewater .....              | 91    | 1,018   |
| Ottawa .....                  | 34    | 399     |
| Nobbs .....                   | 3     | 3       |
| St. Eugene .....              | 378   | 15,977  |
| North Star .....              | 26    | 1,696   |
| Silver Cup .....              | 45    | 1,090   |
| Other mines .....             | ..... | 18,039  |
| Total .....                   | 3,406 | 142,951 |

The total ore shipments for the past week were 40,137 tons, and for the year to date 1,369,599 tons.

## SMELTER RECEIPTS.

|                         | Week.  | Year.     |
|-------------------------|--------|-----------|
| Granby .....            | 8,995  | 739,343   |
| Cons. Co. .....         | 9,097  | 305,170   |
| B. C. Copper Co. .....  | 9,200  | 203,063   |
| Le Roi, Northport ..... | .....  | 12,761    |
| Total .....             | 27,292 | 1,260,337 |

## DOMINION COAL.

The Dominion Coal Company's output is increasing steadily. The figures for the past three months are:

|                 |         |
|-----------------|---------|
| September ..... | 188,500 |
| August .....    | 153,908 |
| July .....      | 135,604 |

The strike began on July 6th.

Returns to the Bureau of Mines show the output of the metalliferous mines and works of Ontario for the six months ending 30th. June, 1909, to have been as follows:

|                      | Quantity.  | Value.    |
|----------------------|------------|-----------|
| Arsenic, tons .....  | 1,517      | \$ 28,320 |
| Gold, ounces .....   | 741        | 14,011    |
| Silver, ounces ..... | 11,234,382 | 5,379,980 |
| Cobalt, tons .....   | 263        | 46,117    |
| Copper, tons .....   | 3,741      | 529,775   |
| Nickel, tons .....   | 6,027      | 1,234,620 |
| Iron ore, tons ..... | 87,738     | 217,341   |
| Pig iron, tons ..... | 211,583    | 3,197,759 |
| Zinc ore, tons ..... | 200        | 2,000     |

The total value of the production was \$10,649,923, as against \$8,082,264 for the first six months of 1908.

There were shipped from the silver mines of Cobalt during the above period, 15,360 tons of ore, including concentrates, as against 9,209 tons in the same period of 1908. The increase in the quantity of silver contents being about 45 per cent. Nickel increased 26 per cent. in quantity and pig iron 44 per cent. Iron ore remained about the same, and there was a slight decrease in copper.

The Consolidated Mining and Smelting Company of Canada, Ltd., ore receipts at Trail smelter for week ending September 18th. and year to date in tons.

|                                 | Week. | Year.<br>to date |
|---------------------------------|-------|------------------|
| Company's Mines—                |       |                  |
| Centre Star .....               | 3,022 | 121,335          |
| St. Eugene (concentrates) ..... | 353   | 16,402           |
| Snowshoe .....                  | 4,366 | 99,295           |
| Other mines .....               | 1,224 | 46,864           |
| Total .....                     | 8,965 | 283,896          |

The Consolidated Mining and Smelting Company of Canada, Limited, Trail Smelter, issues the following statistical statement for the month of August, 1909.

|                       | Month. | Year.  |
|-----------------------|--------|--------|
| Tons ore received.    |        |        |
| Company's mines ..... | 33,908 | 65,798 |
| Other mines .....     | 6,762  | 12,392 |
| Total ore received    | 40,670 | 78,190 |
| Tons ore smelted.     |        |        |
| Copper furnaces ..... | 39,721 | 70,717 |
| Lead Furnaces .....   | 4,457  | 9,733  |
|                       | 44,178 | 80,450 |

#### Metals produced:

|                         | Ounces.   | ...       |
|-------------------------|-----------|-----------|
| Gold .....              | 10,517    | \$215,611 |
| Silver .....            | 256,202   | 131,957   |
|                         | lbs.      |           |
| Copper .....            | 431,560   | 56,167    |
| Lead .....              | 3,834,019 | 103,250   |
| Total gross value ..... |           | \$506,985 |
|                         | Per Ct.   | Per Ct.   |
| Value of gold .....     | 42.53     | 45.23     |
| Value of silver .....   | 26.03     | 23.43     |
| Value of copper .....   | 11.07     | 11.64     |
| Value of lead .....     | 20.37     | 19.70     |
|                         | 100.00    | 100.00    |

### TORONTO MARKETS.

#### Metals.

Oct. 7.—(Quotations from Canada Metal Co., Toronto.)  
 Spelter, 5¼ to 6 cents per lb. (stronger).  
 Lead, 3.75 cents per lb.  
 Antimony, 8½ to 9½ cents per lb.  
 Tin, 32 cents per lb.  
 Copper, casting, 13¾ cents per lb.  
 Electrolytic, 13.75 cents per lb.  
 Ingot brass, 9 to 12 cents per lb. (metal market very strong).  
 Oct 7.—Pig Iron (quotations from Drummond, McCall Co.).  
 Summerlee, No. 1, \$24.00 (f.o.b. Toronto).  
 Summerlee, No. 2, \$23.50 (f.o.b. Toronto).  
 Midland, No. 1, \$22.50 (f.o.b. Toronto).  
 Coal, anthracite, \$5.50 to \$6.75.  
 Bituminous, \$3.50 to \$4.50 for 1¼ lump.

#### Coke.

Oct. 5.—Connellsville coke (f.o.b. ovens).  
 Furnace coke, prompt, \$2.75 to \$2.85 per ton.  
 Foundry coke, prompt, \$2.50 to \$2.75 per ton.  
 Oct. 5.—Tin (Straits), 30.70 cents.  
 Copper, prime Lake, 13.00 to 13.10 cents.  
 Electrolytic copper, 12.90 to 13.00 cents.  
 Copper wire, 14.50 cents.  
 Lead, 4.37½ to 4.40 cents.  
 Spelter, 5.90 to 5.95 cents.  
 Sheet zinc, 8.00 cents.  
 Antimony, Cookson's, 8.50 cents.  
 Aluminium, 23.00 to 24.00 cents.  
 Nickel, 40.00 to 49.00 cents.  
 Platinum, \$26.50 to \$30.25 per oz.  
 Bismuth, \$1.75 per lb.  
 Quicksilver, \$43.00 to \$44.00 per 75-lb. flask.

### SILVER PRICES.

|                   | New York.<br>Cents. | London.<br>Pence. |
|-------------------|---------------------|-------------------|
| September 23..... | 51¼                 | 23 11-16          |
| " 24.....         | 51¼                 | 23 11-16          |
| " 25.....         | 51¼                 | 23 11-16          |
| " 27.....         | 51¼                 | 23 ¾              |
| " 28.....         | 51¼                 | 23 ¾              |
| " 29.....         | 51¼                 | 23 11-16          |
| " 30.....         | 51¼                 | 23 ¾              |
| October 1.....    | 51¼                 | 23 ¾              |
| " 2.....          | 51¼                 | 23 ¾              |
| " 4.....          | 51¼                 | 23 ¾              |
| " 5.....          | 51½                 | 23 ¾              |
| " 6.....          | 51½                 | 23 13-16          |
| " 7.....          | 51¼                 | 23 ¾              |
| " 8.....          | 51¼                 | 23 11-16          |

### MARKET NOTES.

In a circular, dated October 1st, D. Houston & Co., N.Y., have this to say concerning the copper market:—

"The supply and demand problem as it relates to copper is a complex and far-reaching one. The hope for market improvement does not lie so much in the curtailment of output as in an expansion of demand. The modern mining and smelter equipments contemplate operations at high pressure, and if demand lags it must be stimulated by every means possible until it equals production and licks up the surplus stocks. The law of the land, the law of economics, and the necessity of keeping the full complement of labour constantly employed all stand in the way of reducing output. The sensible plan would be to let the development of new properties wait until they are needed. As for the copper mining properties now in the field the world must regard them as permanent factors while ore lasts, organized and equipped to produce up to their capacity irrespective of manufacturing requirements. Shut-downs at mines are expensive remedies, being followed by depreciation of machinery, disorganization of labour forces, and a loss of revenue too heavy for any probable immediate compensating gains likely to accrue. Partial restriction of production also has its drawbacks owing to the increased cost of turning out a smaller product. With the remarkable activity in iron, and the flood of orders pouring into the steel companies, demand for copper will eventually broaden out greatly in a way that will perhaps surprise the entire trade. Copper will yet come in for its full share of the industrial and business prosperity to which the country is looking forward."



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Book Dept. Canadian Mining Journal - Toronto



# PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

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In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The allied metal, cobalt, is also found in Ontario in unsurpassed quantities.

The output of iron, copper, nickel, silver and cobalt in 1906 was much beyond that of any previous year, and large developments in these industries are now going on.

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The mining laws of Ontario are liberal, and the prices of mineral lands low.

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**Steel Castings**

(Acid Open Hearth System)

**Switches and Track Work**  
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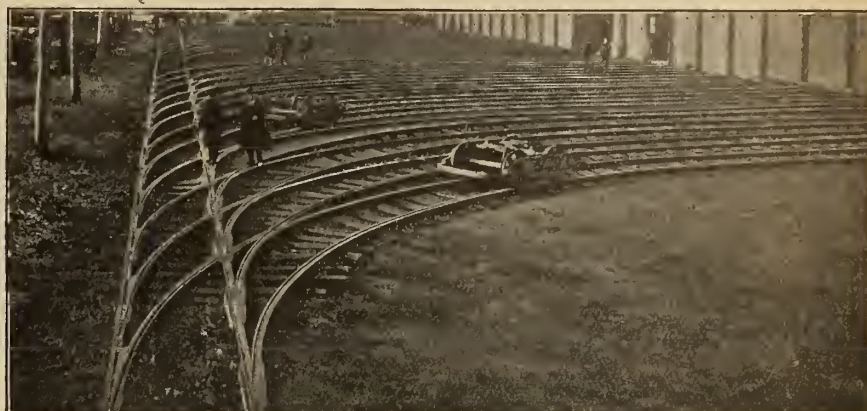
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**INTERLOCKING PLANTS**  
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Head Office: 4 Hospital Street, Montreal

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It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

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Is only one strength, if anything, a little stronger than 50% Dynamite. It does not freeze, or rather, explodes with perfect efficiency when frozen and needs no thawing.

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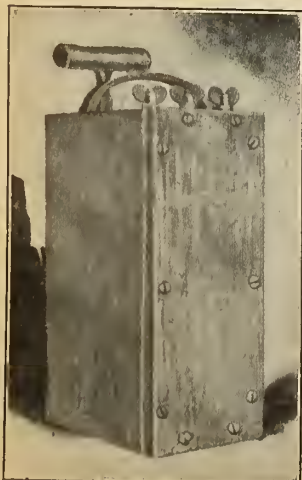
Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

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ARE  
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85 % of the stopes run with power drills in Cobalt within the last two years have been done with "Cleveland" Stoppers—WHY? Because the Superintendents there have found that they will do more work at a lower cost than any other.

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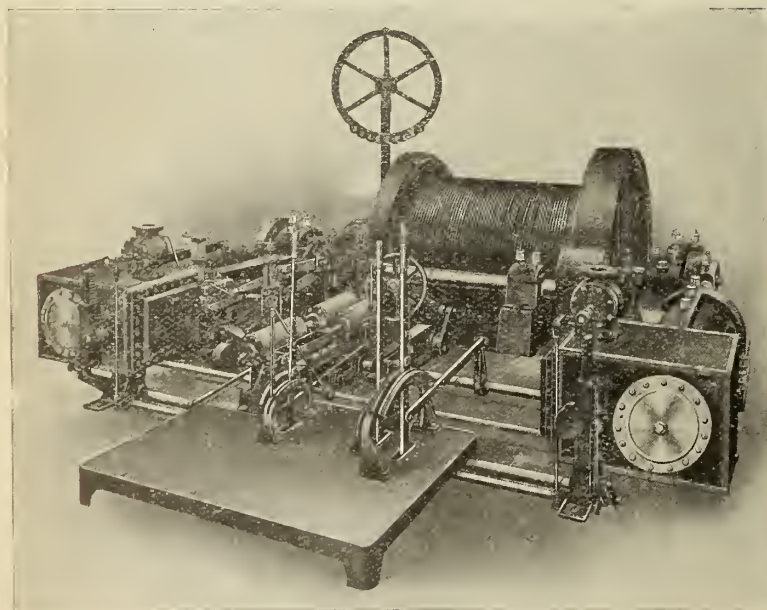
### **THE COST OF MAINTENANCE**

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**We build Complete Coal Mine Equipments**

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Corliss fuel economy in slide valve  
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This low steam consumption is  
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Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



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**"Little Giant"**

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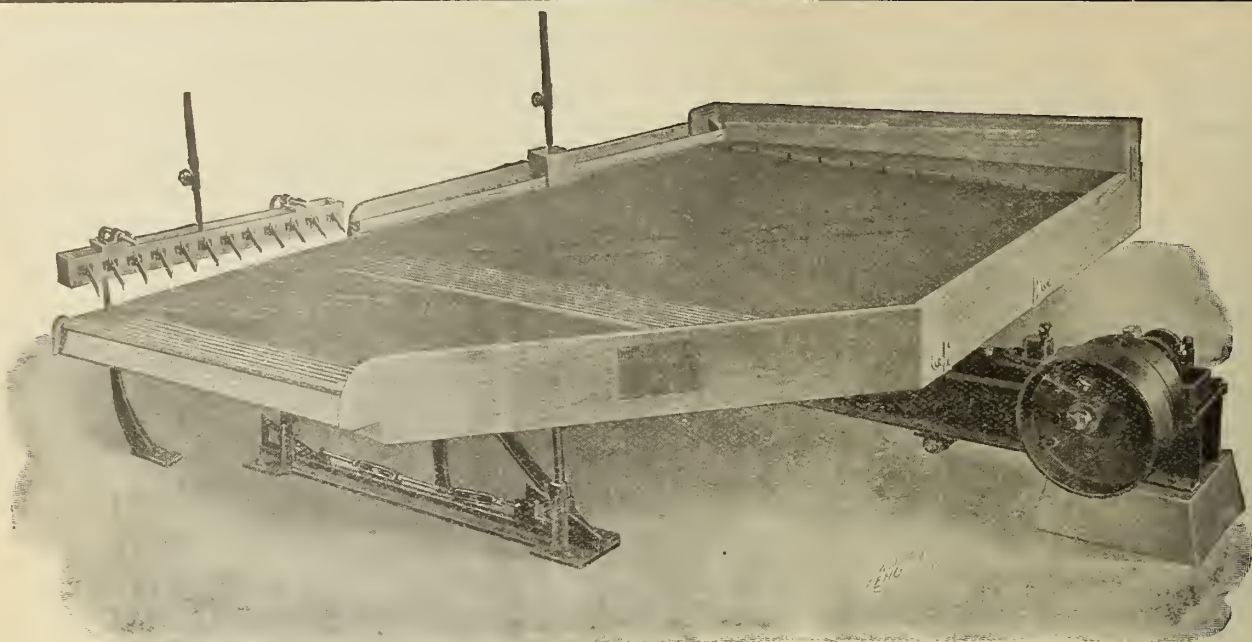
☐ Our claim that the Rand drill is the best in the market is proven by the sale of more of this type than of all other makes combined.

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**Montreal, Canada**

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ESTABLISHED, 1867

B. E. WALKER, C.V.O., LL.D., President  
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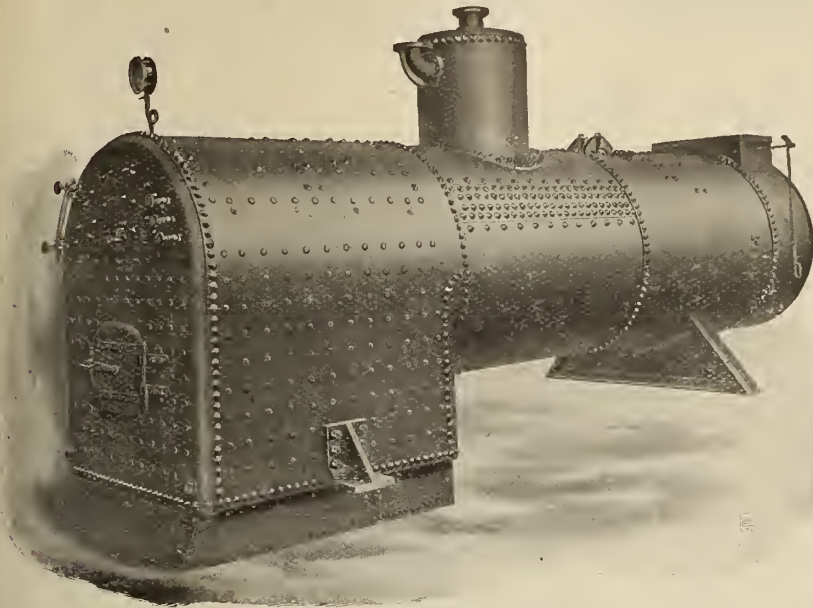
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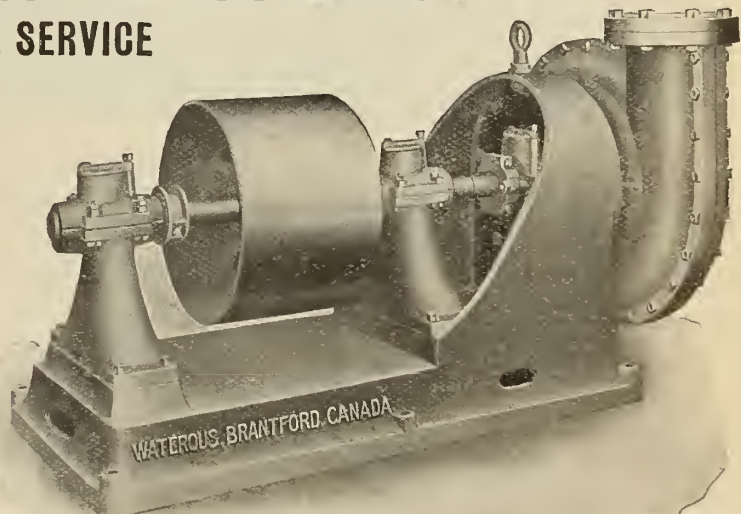
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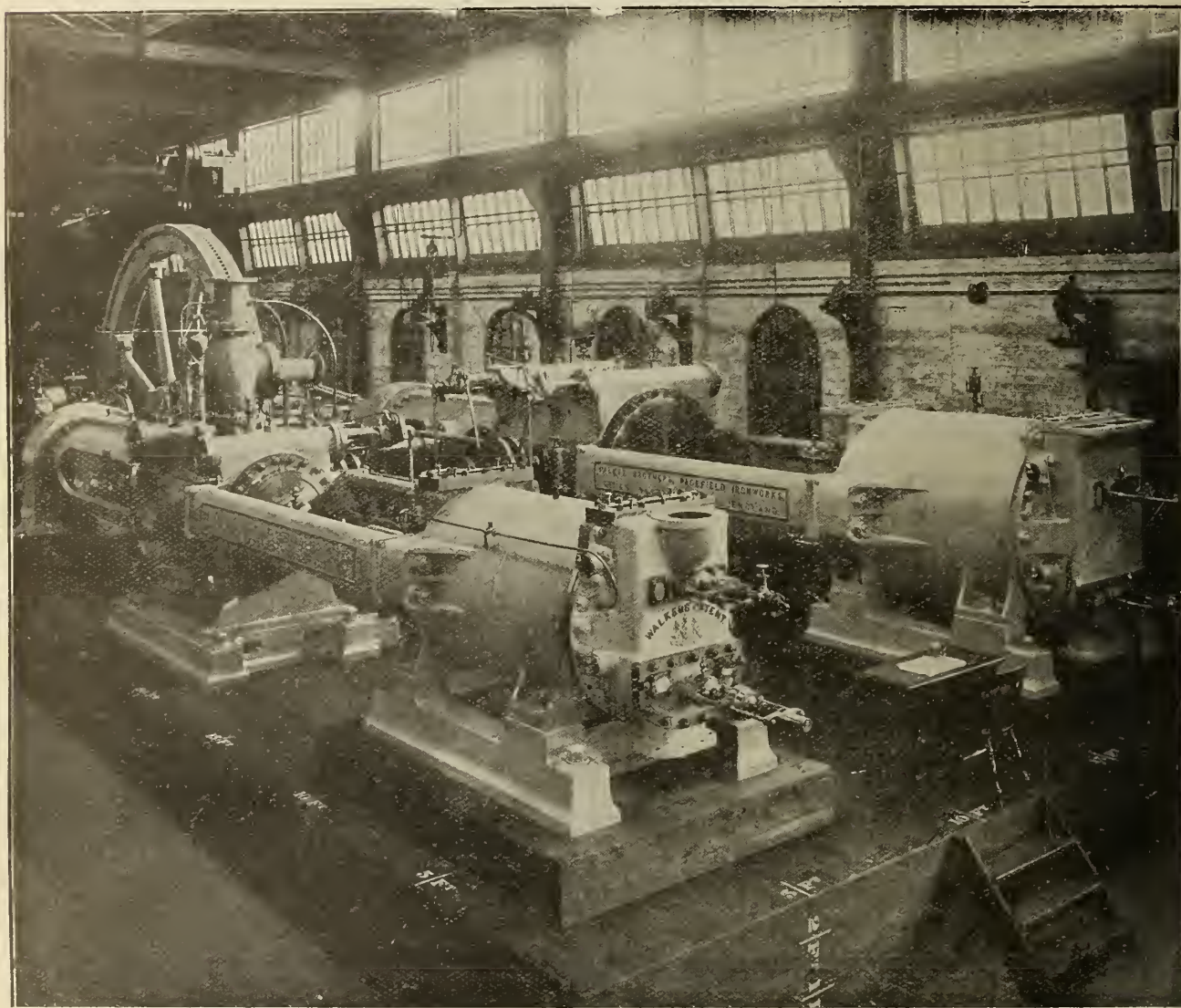


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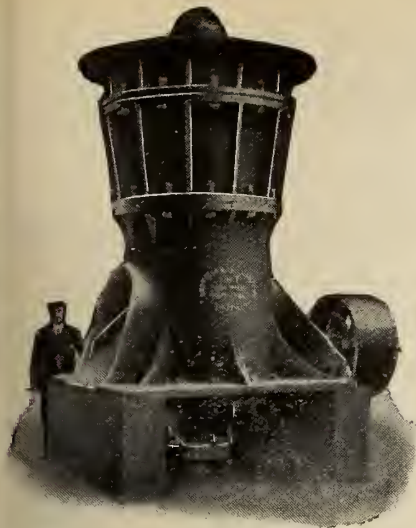
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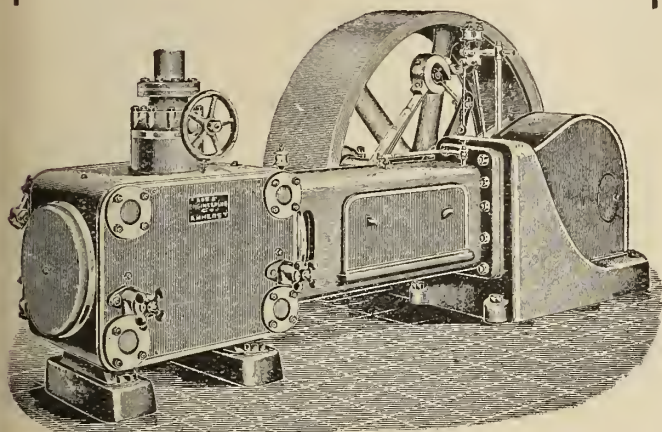
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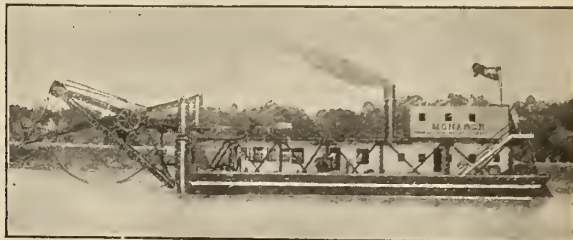
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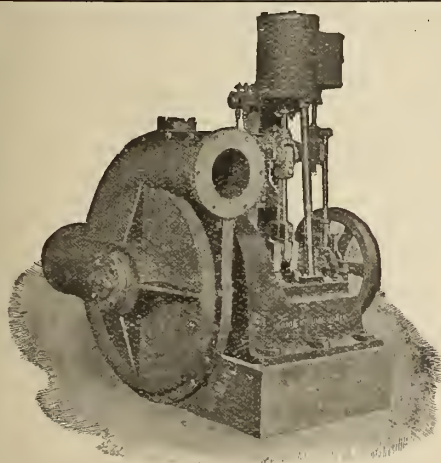
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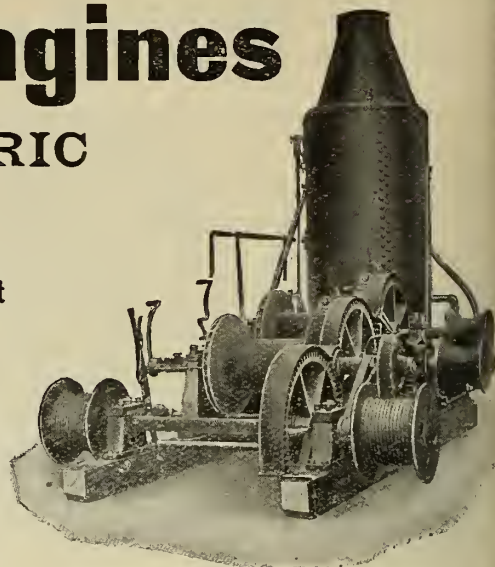
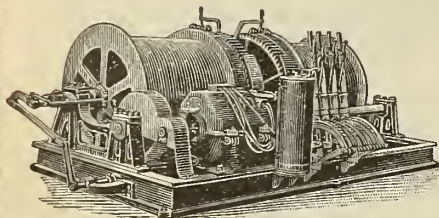
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Write or phone for particulars of special train service for hunters and copies of current hunting literature.

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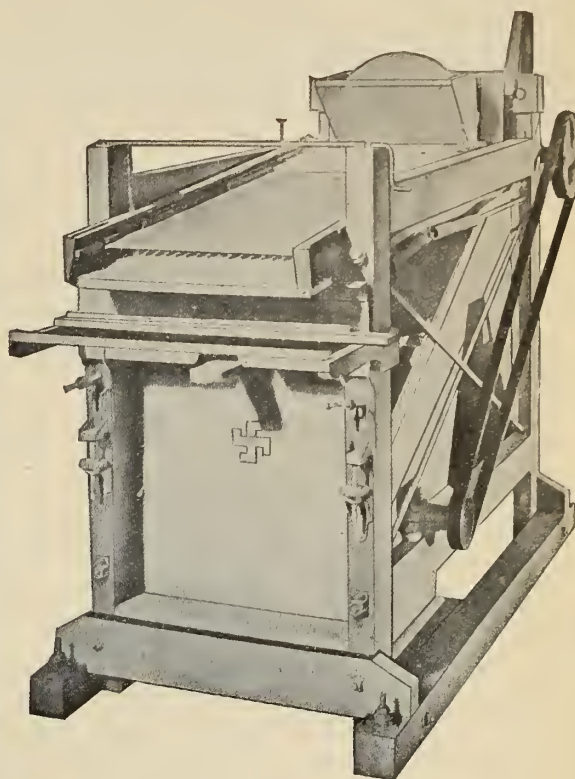
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This system will make low grade deposits pay. Every mine having an eye to business should investigate this system which has the approval of leading mining authorities.

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(Black Diamonds) for Diamond Drills



†Largest carbon ever found. ¼ actual size.

NOTE. We personally break (in this country) our carbons, thereby enabling us to determine accurately their quality. We deal only in very best quality and are always ready to ship goods on approval and for selection to responsible parties. Write us.



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All you need  
is a  
- hammer -  
you'll never  
need a  
paint brush

lay it right over the old roofing. It will cost you less than the continued maintenance of the old roof.

The point to remember is that *you will never need a paint brush* if you buy Amatite roofing. All you need is a hammer, because we supply free nails and liquid cement to finish the job.

Send for free sample of Amatite and you will at once see why it never needs to be painted and why it is more durable and lasting than any other.

Write to-day to nearest office.

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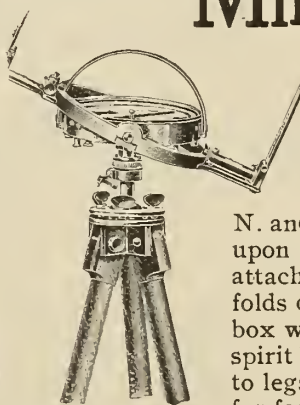
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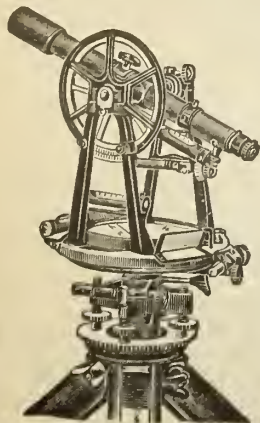
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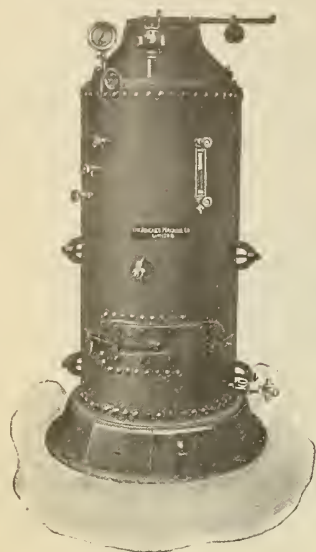
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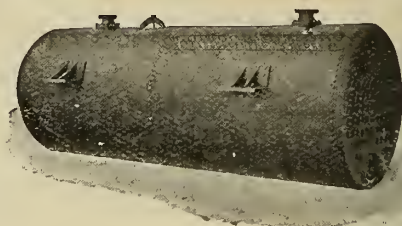
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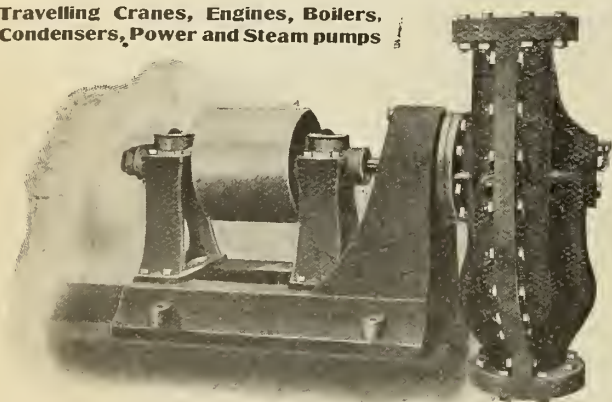
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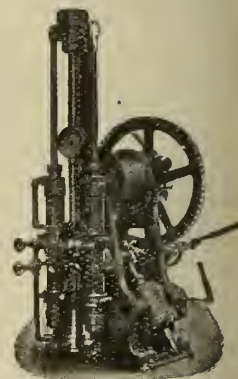
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, November 1, 1909

No. 21

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

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### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

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## THE PROCEEDINGS OF THE SELECT STANDING COMMITTEE OF THE HOUSE OF COMMONS ON MINES AND MINERALS.

Last winter a Select Standing Committee, composed of twenty-five members of the House of Commons, was appointed "to examine and inquire into all such matters and things as may be referred to it by the House; and report from time to time its observations and opinions thereon."

The appointment of the Committee was a compromise. Urgent requests from the Canadian Mining Institute for a Royal Commission had been put before the Government. There is little doubt that these requests would have been granted had mining interests sufficient representation in the House. As it was, the Government could not see its way clear to appoint a Royal Commission, largely, we believe, because of the outlay of money that would be entailed. In every sense this was a blunder, and a blunder that may be fairly attributed to a general lack of information on the part of the House as to the supreme importance of the mineral industries. However, the Select Standing Committee is better than nothing.

Throughout March, April and May the Committee held four meetings. Delegates from the Canadian Mining Institute gave evidence, chiefly on points connected with the granting of mineral rights. The heads of the two branches of the Department of Mines also were questioned. No other witnesses were called.

The printed account of the proceedings of the Standing Committee impresses the reader in several respects. In the first place it is apparent that the members during the first three sessions were bogged. From the minutes of discussions we gather that no one knew what was to be dealt with.

Receiving the evidence of the witnesses was the only work accomplished. At the fourth meeting, however, the Dominion mining regulations and the mining law affecting the Yukon were taken up section by section. Three important resolutions resulted from this meeting. They were:—

1. That there should be assigned to the Department of Mines the administration of mines, including the issue of title thereto, and of all mining laws.
2. That an Act should be passed consolidating all the laws relating to mines under Federal control.
3. That consideration should be given to a policy that will have for its object the re-acquisition by the Crown of mining rights heretofore granted in patents of land.

Of these resolutions, the first calls for most immediate attention. The present cumbrous system gives

rise to confusion and is an actual deterrent to investors. Moreover, there is ground for the belief that grave abuses exist in mining districts that are under Federal administration. This has been true of the Yukon; it is true, we fear, of Alberta. This resolution is timely.

The second resolution, referring to the consolidation of all Federal mining laws, might well be extended to embrace the laws of each Province. Naturally this is a matter that demands long debate and systematic study of the mining laws of foreign countries. Only thus can pitfalls be avoided. Essentially this is work that can best be done by the continuous efforts of a Royal Commission. It is doubtful if any committee, meeting twice or thrice a month, can cope successfully with a subject so large and so intricate.

The last resolution requires little comment. If our country is to reach its appointed goal, all restrictions and hindrances must be removed from the path of the prospector. To-day, thousands upon thousands of square miles of mineral territory may be regarded as lost to the prospector. This applies with equal force to lands administered by the Provincial Governments.

During the coming winter the Committee will continue its investigations. It has succeeded in starting on the right path. But it will require guidance and direction. Last year's delegation from the Canadian Mining Institute was hastily summoned, was by no means representative, and, individually, the delegates were given insufficient time to prepare themselves. Further, the Committee as a whole lacked knowledge of the mining industry.

The latter condition will remedy itself, and it is the duty of the Canadian Mining Institute to see that future delegates have ample time to prepare their evidence. In fact this is a subject that should engage the attention of the executive of the Institute throughout the winter. A strong committee should be appointed at once. The Institute can do more than any other body to enlighten Ottawa as to the requirements of mining.

Incidentally, we can see little use in having twenty-five members on the Select Standing Committee of the House. Ten carefully chosen members would accomplish more in a given time with less friction and with more effect. The attendance at the four meetings last session never exceeded fourteen, and once dwindled to five. What results can we expect in these circumstances?

A Royal Commission, consisting of five selected and representative men, adequately remunerated for their labours, would have arrived long before this at results that will not for many months be attained by the Committee as at present constituted.

Our hope is that the very meagreness of the reports under discussion will induce the Select Standing Committee itself to recommend a Royal Commission.

### THE MINERS' MINE.

That capital and caste have their uses was demonstrated in a curiously effective manner by the failure of a socialistic venture in France.

It was in the year 1891 that a concession of about 200 acres of coal lands in the Loire coal basin was purchased largely by public subscription, and placed in the hands of an association of workingmen, amongst whom all profits were to be equally divided.

With a tremendous flourish of trumpets the Miners' Mine became an active producer of coal.

Before affairs had got decently in working order trouble arose. Outside miners, not members of the society, were employed by the regular members. The outsiders claimed a share in the profits.

Another source of strife and heart-burnings was the fact that during the times of depression, a general reduction in wages had to be made. Against this the miners kicked violently. The logic of the situation did not appeal to them. The controlling power of capital was absent, and wages fluctuated with every temporary vicissitude.

The impatience of the miners (in this case the shareholders) and the ludicrous impossibility of the whole scheme, became most potent in 1905. In that year no less than five chairmen were successively elected and deposed.

The closing scenes in the history of the Miners' Mine were enacted in the autumn of 1908. An exhausted treasury, urgent creditors, two serious fires and severe trade depression, together with internal dissensions were more than the shaky edifice could stand. The collieries were closed, a receiver was appointed, and the society breathed its last painful corporate breath.

It is not for us to say that all such experiments are foredoomed to failure. But there does appear to be an illustration here of the futility of attempting to apply the fantastic principles of socialism—the socialism that is expounded by labour agitators—to a modern business enterprise. We fear that before a Miners' Mine will have proved a commercial success coal will have been superseded as a source of energy.

---

### INSPECTION OF MINES.

Already in the United States there are indications that mine inspection is to become a conjoint function of the Federal and State authorities. This has been proved the more imperative by last year's shocking coal mine catastrophes. The United States Geological Survey has taken the matter in hand, and has begun an educational campaign.

Doubtless this consummation will not be reached rapidly. Difficulties expected and difficulties as yet unforeseen will crop up. But it must be brought about sooner or later, for only thus can the highest degree of safety be guaranteed to those who labour underground.

What is true of the United States is doubly true of Canada. Uniformity in our mine inspection regulation



is needed. So long as inspection is left entirely to provincial officials it will be neither adequate nor effective. Working hand-in-hand with a well-organized Federal Bureau, the provincial departments would do infinitely better than is at present possible.

The Nanaimo disaster provides material for very serious thought. It is possible, nay, even probable, that proper inspection would have prevented the loss of 32 lives.

The civilized countries of the world not only insist upon the regular inspection of coal mines for the presence of dangerous quantities of gas but they also regulate the use of safety lamps, prohibit certain explosions, investigate the hygienic conditions of collieries, investigate the causes of accidents, and encourage the use of rescue apparatus.

We fear that Canada has not done her duty in these respects. Apparently we are content to wait until the toll of human lives shall have become so inordinately large that indifference will no longer be possible.

#### DORIC RESERVE MINES, LIMITED.

In the Toronto World of October 11th, and in the Montreal Standard of October 16th, appeared advertisements of the Doric Reserve Mines, Limited. The name of Mr. A. A. Hassan, mining engineer, was used in these advertisements. We have been requested by Mr. Hassan to state that he has made no report for the Doric Company and that he could not possibly verify the statements advertised. Mr. Hassan is taking steps to force the offenders publicly to retract their misstatements.

Prompt action of this kind is to be commended. Liberties taken with the good name of mining engineers deserve severe punishment.

#### EDITORIAL NOTES.

We are informed, on excellent authority, that, in addition to the iron and steel works projected for Vancouver Island by the Irondale Syndicate, another large steel concern contemplates the erection of a plant. This will give Vancouver a solid industrial backbone.

An editorial in the November number of The Mining Magazine concludes thus: "Vendors and promoters should not report on mines; it is as honourable to be a promoter as to be an engineer, but the combination is prejudicial to sound business." This truth cannot be repeated too frequently. At the present stage of development it applies with especial force to Canadian mining engineers.

Estimates secured by the Royal Commission on Mines give the cost of watering the workings of large collieries by the "man and hose" system. In one Ger-

man mine the cost, over a period of 14 years, averaged 1 1-2d. per ton. At another German colliery the cost in material and wages was slightly over 1d. per ton. Costs in South Wales range all the way from 1.72d up to 5d per ton. The last figure includes repairs to roadways rendered necessary by the watering.

#### CORNISH TUNGSTEN ORE.

At the semi-annual meeting of South Crofty, Limited, a mining company operating at Carn Brea, Cornwall, some instructive figures were adduced bearing upon prices current for tungsten ores.

The ore-treatment is complex. Tin, tungsten, and arsenic are recovered. During the six months ending June 30th, 335 tons of tin, 72 tons of tungsten concentrate, and 304 tons of arsenic (200 tons of the arsenic being white refined) were recovered from 29,154 tons of ore; 31.8 pounds of tin and tungsten were recovered per ton of ore crushed. The total value of the three commodities was £34,056 19s 14d.

During the six months an arsenic refinery and twenty stamps were added to the surface plant. Including development and additions, the average working costs were 19s 3d per ton. Total profits amounted to £6,187 14s 1d; net profits, £5,187 14s 1d.

The average price for tin was £76 3s 2d; for tungsten, £78 9d. Tungsten showed a falling off of £10 per ton as compared with the previous six months. But latterly the price has improved substantially. The tungsten concentrate was kept constantly up to 64 per cent.

#### PLATE HOUSES.

The use of heavy stamps on the Rand has brought about one radical modification in mill design. The latest mills are constructed with separate houses for the amalgamation plates, as it has been found advantageous to remove entirely the plates from the crushing section of the mill.

This innovation permits of any desired arrangement of the plates. Inasmuch as the product of any one battery may be diverted to each of several plates, the necessity of hanging up a battery before cleaning the plates is obviated. The time saved by this is supposed to add at least 10 per cent. to the efficiency of the plant.

Another hardly less important result is the facility with which samples of the crushed ore may be taken by placing automatic samplers in the launder that conveys the pulp from the stamps to the plate-house.

Incidentally it is possible to watch the tables much more closely. In large plants this makes for better practice, and has the advantage of minimizing amalgam-stealing.

Detached plate-houses have much to recommend them even for small plants.

Gelignite is the most largely used explosive in the mines of Western Australia. Last year 3,251,928 lb. of gelignite were used, as compared with 438,500 lb. of blasting gelatine and 339,852 lb. of gelatine dynamite. For the storage of explosives there are 74 magazines in the state, having a total capacity of 11,190 tons. These are placed on reserved land, and are fitted with specially devised lightning conductors.



# THE WINNIPEG MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

(Written for the Canadian Mining Journal by Cyril W. Knight.)

The seventy-ninth annual meeting of the British Association for the Advancement of Science opened in Winnipeg on the twenty-fifth of August. The society has during the last quarter of a century, held three meetings in Canada. In 1884 Montreal was the centre, while in 1897 Toronto was its headquarters. At the Montreal meeting the people of Winnipeg took the opportunity to invite the members to visit Manitoba. Those who did this, and who also this year attended the Winnipeg meeting, have been profoundly impressed with the strides the West has made. As a matter of fact this was one object of the meeting being held in Winnipeg this summer; and the splendidly arranged excursions across the golden prairies of our North-West to the mountains of British Columbia and the Pacific Coast must surely have aided to dispel the false impression given to the British people in Kipling's "Our Lady of the Snows."

It was natural, perhaps, that physics should dominate the meeting in view of the fact that Sir Joseph Thomson was president. He gave his memorable presidential address in the Walker Theatre on the evening of the twenty-fifth, and those who heard it are not apt to forget the occasion for many years. Sir Joseph Thomson has a startlingly clear and deep voice for a man of his stature, and this, combined with a perfect enunciation, made all of the address a delight, even to the layman. The address was of necessity largely technical, but the personality of the man always seemed to hold attention even when the listener could not follow, and the simplicity of his literary style was another added charm. The previous presidents at the meeting of the British Association in Canada were Lord Rayleigh and Sir John Evans. Without attempting to give any complete resume for the Canadian Mining Journal of an address on physics the parts bearing only on geological matters are here stated. But, in passing, it is interesting to note his urging of the deeper study of mathematics on all physicists, and the plea that mathematicians study physics. The billiard player need no longer regard his expertness as the sign of a wasted life. One of Sir Joseph's first pupils was in the beginning utterly indifferent to mathematics, but was an expert billiard player. Sir Joseph showed his pupil that the collision of elastic billiard balls illustrated profound mathematical laws. "From that time he was a changed man. He never before regarded mathematics as anything but a means of annoying innocent graduates. Now, when he saw what important results it could obtain he became enthusiastic about it, developed very considerable mathematical ability, and, though he had already wasted two out of three years at college took a good place in the mathematical Tripos."

The recent advances made in the study of radio-activity, and their bearing on geological problems were particularly interesting, and the following paragraphs are given in full.

"The properties of radium have consequences of enormous importance to the geologist as well as the physicist or chemist. In fact, the discovery of these proper-

ties has entirely altered the aspect of one of the most interesting geological problems, that of the age of the earth. Before the discovery of radium it was supposed that the supplies of heat furnished by chemical changes going on in the earth were quite insignificant, and that there was nothing to replace the heat which flows from the hot interior of the earth to the colder crust. Now, when the earth first solidified it only possessed a certain amount of capital in the form of heat, and if it is continually spending this capital and not gaining any fresh heat it is evident that the process could not have been going on for more than a certain number of years, otherwise the earth would have been colder than it is. Lord Kelvin in this way estimated the age of the earth to be less than 100 million years. Now, though the quan-



Sir J. J. Thomson, and wife President of the British Association for the Advancement of Science.

tity of radium in the earth is an exceedingly small fraction of the mass of the earth, the average amount of radium in the material of which the earth's crust is composed, according to the valuable determinations of Professors Strutt and Jolly, only amounts to about five grammes in a cube of the material whose side is 100 miles, yet the amount of heat given out by this small quantity of radium is so great that it is more than enough to replace the heat which flows from the inside to the outside of the earth.

"This, as Rutherford has pointed out, entirely vitiates the previous method of determining the age of the earth. The fact is that the radium gives so much heat that we do not quite know what to do with it, for if there was as much radium throughout the mass as there is in the earth's crust, the temperature of the earth



would increase much more rapidly than it does as we descend below the earth's surface. This, as Professor Strutt has shown, proves that if radium behaves in the interior of the earth as it does at the surface, then rocks similar to those in the earth's crust cannot extend to a depth of more than forty-five miles below the surface.

"It is remarkable that Prof. Milne from the study of earthquake phenomena had previously come to the conclusion that rocks similar to those at the earth's surface only descended a short distance below the surface; he estimates this distance at about thirty miles, and concludes that at a depth greater than this the earth is fairly homogeneous."

His concluding remarks were:

"The new discoveries made in physics in the last few years, and the ideas and potentialities suggested by them, have had an effect upon the workers in that subject akin to that produced in literature by the Renaissance. Enthusiasm has been quickened, and there is a hopeful, youthful, perhaps exuberant, spirit abroad which leads men to make with confidence experiments which would have been thought fantastic twenty years ago. It has quite dispelled the pessimistic feeling, not uncommon at that time, that all the interesting things had been discovered, and all that was left was to alter a decimal or two in some physical constant. There never was any justification for this feeling, there never were any signs of an approach to finality in science. The sum of knowledge is at present, at any rate, a diverging not a converging series. As we conquer peak after peak we see in front of us regions full of interest and beauty but we do not see our goal, we do not see the horizon. In the distance tower still higher peaks, which will yield to those who ascend them still wider prospects, and deepen the feeling, whose truth is emphasized by every advance in science, that "Great Are the Works of the Lord."

The meetings of the different sections of the society were begun on the twenty-sixth and continued until the last day of August. It was necessary to distribute the sections among the various public buildings of Winnipeg. In spite of the almost appalling number and variety of subjects taken up, only morning sessions were for the most part held. It would seem that the Canadian Mining Institute, which holds at times three sessions a day until one is dizzy with new ideas—and smoke—might well consider this arrangement. The scientific work of the Association is transacted under the following departments of knowledge:

- Section A—Mathematical and Physical Science.
- Section B—Chemistry.
- Section C—Geology.
- Section D—Zoology.
- Section E—Geography.
- Section F—Economic Science and Statistics.
- Section G—Engineering.
- Section H—Anthropology.
- Section I—Physiology.
- Section K—Botany.
- Section L—Educational Science.

The papers of Section C, Geology, only are here given:

President's Address—The Evolution of Vertebrate Animals as Shown by Fossils.

J. B. Tyrrell—The Geology of Western Canada.

A. P. Coleman—The Extent of the Ice Sheets in the Great Plains.

Warren Upham—The Glacial Lake Agassiz.

E. F. Chandler—The Rainfall Run-off Ratio in the Prairies of Central North America.

A. P. Coleman—The Bearing of Pre-Cambrian Geology on Uniformitarianism.

W. G. Miller—The Pre-Cambrian Rocks of Canada.

A. R. Dwyerhouse—An Outline of the Glacial Geology of Britain, illustrative of the work of the Committee on Erratic Blocks.

Aubrey Strahan—The Glacial Geology of South Wales.

David Woolacott—On the Classification of the Permian of the North of England.

Herbert Bolton—New Faunal Horizons in the Bristol Coalfields.

S. H. Reynolds—Description of the Avon Section, Bristol, in illustration of Dr. A. Vaughan's work on the English Carboniferous Limestone.

S. H. Reynolds—Lithology of the Carboniferous Limestone of Burrington Combe, Somerset.

Ernest Discon—On Some Structures in Limestone Formations.

#### PAPERS ON THE ORE DEPOSITS OF CANADA.

Prof. W. G. Miller—Gold and Silver.

Prof. A. P. Coleman, Ph.D.—Copper and Nickel.

Prof. W. G. Miller—Iron.

J. B. Tyrrell, M.A.—Placer Mining.

Prof. T. L. Walker, Ph.D.—Rare Metals.

Prof. J. W. Gregory, D.Sc., F.R.S.—Report of the Committee on South African Strata.

Charles F. Jurtz, M.A., D.Sc.—Topographical and Geological Terms in South Africa.

Report of the Committee on Topographical and Geological Terms in South Africa.

Tempest Anderson, M.D.—The Volcano of Metavanu.

Prof. J. W. Gregory, D.Sc., F.R.S.—Exhibition of the Material described as Geyserite from the Mount Morgan Mine, Queensland.

A. Smith Woodward, LL.D., F.R.S.—Discovery of Dinosaurs in the Cretaceous of Australia.

A. Smith Woodward, LL.D., F.R.S.—Discovery of a Dinosaurian tooth in the Trias of Brazil.

Henry C. Beasley—Report on Footprints Found in the Trias of Great Britain (Lantern).

Prof. S. H. Reynolds, M.A.—Certain Aspects of British Scenery as illustrating the work of the Geological Photographs Committee (Lantern).

E. S. Cobbold—On Some Further Excavations Among the Cambrian Rocks of Comley, Shropshire, 1908.

Prof. S. H. Reynolds, M.A.—Report of the Committee on the Geology of Glensaul, Co. Galway (Lantern).

Report of the Committee on the Drift Deposits of Kirmington, etc.

Report on the Crystalline Rocks of Anglesey.

Report on the Chemical Composition of Charnwood Rocks.

Report on the Salt Lakes of Biskra, Algeria.

In his presidential address to the geological section, A. S. Woodward said there had been an unfortunate tendency during recent years for the majority of geologists to relinquish the study of fossils in absolute despair. More ample material for examination and more exact methods of research have altered many erroneous names that were originally used; while the admission to scientific publications of too many literary exercises on the so-called "law of priority" has made it necessary to learn not one, but several names for some



of the genera and species which are commonly met with. He finds that it is necessary to combat the mistaken popular belief that the main object of studying fossils is to discover "missing links" in the chain of life. The geologist, on the other hand, knowing well that he must remain satisfied with a knowledge of a few scattered episodes in the history of life which are always revealed by the merest accident, marvels that the discovery of "missing links" is so constant a feature of his work; and he is convinced that, if circumstances were more favourable, he would be able to satisfy the demand of the most exacting critic. He has found enough continuous series among the mollusca, for example, and so many suggestions of equally gradual series among the higher animals, that he does not hesitate to believe without further evidence in the process of descent with modification. The mere reader of books is often misled by the vagaries of nomenclature to suppose that the intervals between the links are greater than in reality; but for the actual student it is an everyday experience to find that fossils of slightly different ages which he

than chance-variation or response to environment however much these phenomena may have contributed to certain minor adaptations.

The paper by Warren Upham on the glacial Lake Agassiz was interesting because the city of Winnipeg is built on the bottom of this lake; and for many miles the country is to the eye perfectly flat. It attained an area of about 110,000 square miles, exceeding the combined areas of the five great lakes tributary to the St. Lawrence River, and at the present day it is represented by Lake Winnipeg. In its earliest and highest stage Lake Agassiz was more than five hundred feet deep above the site of the city of Winnipeg.

A. P. Coleman, in his paper on "The Bearing of Pre-Cambrian Geology on Uniformitarianism" would have us believe that a glacial period existed during the time in which the Homer Huronian conglomerates were laid down. On the Trethewey property at Cobalt he has found pebbles in the conglomerate which have scratches on them that are exactly similar to those scratches and markings found on pebbles and boulders



SILVER ISLET, LAKE SUPERIOR.

once thought distinct are linked together by a series of forms in which it is difficult to discover the feeblest lines of demarcation. He is therefore justified in proceeding on the assumption that in all cases the life of our geological period has passed by a natural process of descent into that of the next succeeding period; and, avoiding genealogical guesswork which proves to be more and more futile, he strives to obtain a broad view of the series of changes which have occurred, to distinguish between those which denote progress and those which lead to stagnation or extinction. When the general features of organic evolution are determined in this manner, it will be much easier than it is at present to decide where missing links in any particular case are most likely to be found.

Mr. Woodward desired especially to emphasize the interest and significance of the persistent progress of life to a higher plane, which we observe during the successive geological periods. For, he said, palaeontologists are now generally agreed that there is some principle underlying this progress much more fundamental

in glacial till or boulder clay. In the fine-grained greywacke large granite boulders occur, which apparently have been transported some miles from their source. A glacial origin, he thinks, can only explain their presence, and the widespread occurrence of the conglomerate is another point emphasized. Dr. Coleman read a similar paper a year ago last January before the Geological Society of America at Albuquerque. It was pointed out then by Van Hise and others that if these conglomerates are glacial in origin we ought somewhere to find the glaciated basement on which they rest. This has never been found. On the contrary, wherever the contact of the conglomerate with the underlying Laurentian granite and Keewatin greenstones has been studied the basement is breaking down in situ. Therefore it is certain that some of the Lower Huronian has been found in place and not transported by ice. To this it is replied by Dr. Coleman that the double-clay of to-day in many places rests on a surface which shows no glacial scratches and that further, the Dwyka, in South Africa, does not always have a glaciated



basement. Regarding the presence of the large granite boulders in the conglomerate, it was pointed out by Dr. Miller in his Cobalt report some years ago, that their presence could not be taken as proof of a glacial origin, because they might be transported by severe floods or freshets. Prof. Hobson, of Manchester, England, in summing up the case, remarked that the



Fine example of Spheroidal Weathering of Trap, Sudbury, Ont.

finding of scratched pebbles in one place only was hardly sufficient evidence of the glacial origin of the Lower Huronian conglomerate, because it was reasonable to suppose these scratches might be produced by other agencies. But that if in several widely separated areas scratched boulders and pebbles were discovered the case would have a different aspect. All geologists are quite willing to admit the probability of a glacial period in Pre-Cambrian times, and while several points have now been brought forward which support the theory, it has not as yet been accepted by all. Until a true glacial basement has been found the subject will remain an open question. Prof. Fairchild, on the other hand, considers that it is not surprising that the glaciated floor has been destroyed. Meanwhile the controversy has led to many interesting discussions.

W. G. Miller briefly reviewed the pre-Cambrian rocks in Canada. He pointed out that these occupied the largest area in America. In them occur the enormous iron and copper deposits of the Lake Superior region, the nickel, copper and silver deposits of Sudbury and Cobalt, and so on. An exceedingly small fraction of these pre-Cambrian rocks only has been prospected, so that an optimistic outlook of the future mining industry in these unexplored regions would seem justified.

On reading his paper on the glacial geology of Britain, A. R. Derryhouse remarked that it might seem

rather absurd to us in Canada that a committee should be organized to preserve the erratic blocks found in Britain. This was necessary, however, because they were being slowly destroyed in some parts. His paper showed the very complex nature of the glaciation in Britain.

Gold, silver, copper, nickel, iron, placer mining, and the rare metals in Canada were briefly reviewed by A. P. Coleman, W. A. Miller, J. B. Tyrrell, and T. L. Walker. In the discussion which followed on the origin of the Sudbury nickel deposits it was pointed out by Prof. Gregory that the work of Dickson, Campbell and others, who regard the economic bodies of ore to be largely of secondary, rather than igneous, origin, should not be ignored.

A paper which was most interesting to students of Keewatin lavas in America was read by Tempest Anderson, on the "Volcano of Metavanu." He discussed the actual forming of pillow or ellipsoidal lavas in water. As is well known our Keewatin series in the United States and Canada is regarded as being made up of submarine basic lava flows, one of whose characteristics is this pillow or ellipsoidal texture. So that the story of these structures in the making by a keen observer who had just returned from actually seeing was of great interest.

From Sudbury the party went to Fort William and there chartered a steam launch in order to spend a day



The old miners' cottages at Silver Islet have now been turned into haunts for the summer girl.

at Silver Islet. Here we found the piers and buildings fast falling to pieces and moss everywhere on them. The structure in which the Frue Vanner had its birth is still there, but of the original machines nothing remains. A new era has come. Along the mainland opposite the island a long row of miner's cottages have now been



turned into haunts for the summer girl, and excursion boats convey picnic parties to the celebrated spot where in former years old time miners and car-loads of machinery were launched. Even the rocks have changed. The dump from the underground working was thrown into the lake and the blocks and fragments of calcite and harder trap have now become rounded like the ordinary pebbles found on the sea shore. This was most interesting and instructive to the geologists, showing as it did the comparatively short time in which wave action destroys rock fragments.

After the meeting in Winnipeg about two hundred officers and guests of the Association left for the West in what was popularly spoken of as the science special train. The arrangements made by the Canadian Pacific and Canadian Northern were most satisfactory. The prairie country, that strange region of wonder and monotony, received its due share of attention, and short stops were made at Regina, Moose Jaw, Calgary and Edmonton. There must indeed be some strange fascination which holds men and women on these treeless, rolling plains, where houses are far apart and where the beauty of the East is not.

From the prairies the special was slowly pulled up into the snow-capped Rockies, from whose breasts at Banff flowed the hot sulphur springs, and the ice cold stream from the glaciers. They saw, nestling near the foot of a ridge, within sight of the hotel, the Alpine Club, that home of enthusiasts who climb to the dizzy heights of the rarer atmosphere for reasons other than the glory of God. While below, in the valley of the Bow River, a herd of buffalo preserved by the Dominion Government, looked up in quiet wonder at it all! At Laggan the point of interest was Lake Louise, some six thousand feet above sea level, and surrounded on three sides by abrupt mountains as high again. Further west still, in the heart of the Selkirks, the party stopped at Glacier, where within half an hour of the railway station and hotel the foot of a great glacier was examined.

From here to the Pacific Coast is a journey of about three-quarters of a day. A short time was spent at Vancouver, where Stanley Park, whose flora is almost tropical, was seen by some of the party. Then the fastest boats on the Pacific Coast, owned by the Canadian Pacific Railway, were taken to Victoria. Some of the members ran south to Seattle, in which city the Alaska-Yukon-Pacific Exposition is being held. Among the great number of buildings the forestry structure was, perhaps, the one most admired. It is built of enormous fir trees, all said to have been obtained within a radius of fifty miles of Seattle. The front part of the building, a photograph of which is here shown, is supported by fir trees several feet in diameter. The bark was allowed to remain on this timber, and the building will be preserved for the University of Washington.

In the Canadian building there were many things to make the British subjects of Canada very much at home. Especially did this apply to the miner and geologist, for the familiar look of the silver ore from Cobalt, the nickel sulphides of Sudbury, the feldspar of Frontenac County, the coals of the Maritime Provinces and the gold and copper ores of British Columbia made one feel quite sure that he was in his native land.

The return journey over the prairies was made on the Canadian Northern Railway, and the main party reached Winnipeg on September the thirteenth. Several, however, went from Victoria to the gold fields of the

Yukon, others to California, and thence to New York via the Grand Canyon of Arizona.

A breezy writer in the Winnipeg Free Press Bulletin sums up the excursion in this manner:

"Assuredly no such train as the science special has ever before traversed the 1,500 miles between Winnipeg and Vancouver. From the historic universities of the United Kingdom, from the newer seats of learning of the great industrial centres, from institutions of renown like the British Museum, from the Canadian and the American universities have come these men of science. Among them have been the heads of great laboratories of research, designers of battleships, heads of geographical and geological surveys, great chemists, great physicists, great anthropologists, great mathematicians and great astronomers. These are the men who have been revising, and in many cases radically revising, their estimate of western Canada. In the old land amid much wealth and much sordidness, in the throng of the many who have failed and of a few who have



Canadian Pacific Railway Cut, Sudbury District, in which the nickel deposits were first discovered.

succeeded brilliantly, these men of science have lived and moved and had their being. There they pass to and fro within narrow limits. They are not seen or heard except by a sprinkling of their fellows. They pass down the streets of the great city unknown and unnoticed. They smile not upon the multitude. They conceal their look from the crowd.

"In Western Canada these self-same men have broadened, have expanded, have opened and unbent. They have gone through the train and strolled along the platform with smiling countenances. They have shaken hands and conversed with westerners whom they did not know and whom probably they will never see again and they did it without being introduced.

"They have eaten onion salad and angel cake in a Methodist church in Calgary. They have waited their turn for washing and shaving, and have joked while they waited. They were approachable everywhere, and at all times. Indeed, they approached others. In brief they were sociable, genial and jocular. They told every one they were enjoying themselves and they were."



# ELECTROCHEMICAL PLATE AMALGAMATION.

(By Elmer Ellsworth Carey.)

[Note.—The original draft of the following article first appeared in the May, 1909, issue of the *Electrochemical and Metallurgical Industry*, of New York. For the purpose of explanation and to emphasize certain points, the author has added a few paragraphs, and made some changes in the text. The amended article appears below.—Editor.]

Within the last decade the problem of using electricity in a practical and efficient manner in the extraction of values in metallurgical processes has received the earnest attention of many investigators. It has long been known theoretically that the action of mercury and cyanide may be greatly intensified by the introduction of electrochemical conditions, and inventors have been at work on the problem of constructing suitable apparatus to make practical use of the powerful aid of the electric current.

One of the first applications of electrochemics to modern metallurgical methods consisted in suspending a plate (cathode) in a cyanide tank and recovering the values thereon directly by electro deposition. This slight improvement was found to give an improved extraction, and it is strange that the matter did not receive more attention, as this advance, slight as it was, pointed the way to still greater improvements, and was a hint that should not have been overlooked.

The next step was to electrify the entire contents of the tank, thus reinforcing the cyanide with the powerful cleansing and reducing action of electrochemical forces; with proper electrolytic conditions it was found that the percentage of extraction is much higher and the time of treatment much shorter; and at the same time, as the values pass into the solution, they are simultaneously deposited on the amalgam plate by the electro-plating action of the current, and the cyanide released for another cycle. The great efficiency of this system over the usual cyanide methods has been fully demonstrated; it is quicker, more positive, extracts a higher percentage of values, costs less to install and to operate, and in addition will extract values from pulp which is not susceptible to the action of ordinary cyanide solutions.

Turning to the amalgamating practice, it may be said that electrochemical methods may now be successfully used in connection with the usual battery plate. After a long series of experiments, extending over a score of years, a very simple method of converting the standard plate into an electrochemical amalgamating device of remarkable efficiency has been devised. The electrochemical system of amalgamation is designed to extract from the sands or pulp all gold values not encased; it is entirely a new system of amalgamation, designed to do the work of the ordinary mill plate, including the treatment of slimes, and at the same time to extract values which cannot be saved by the usual mill practice and which otherwise would require cyanide treatment; to do all this in one single inexpensive and continuous operation, requiring practically no more outlay for installation and maintenance than the usual mill plate. The system also furnishes a method by which the Alaska beach deposits, black sands, hydraulic, placer and dredge tailings, mill tailings, desert deposits and many low grade propositions can all be profitably

worked. The broad claim made for the electrolytic system is that it will save all values not encased.

**Preliminary Treatment.**—It may be sometimes necessary to grind ore or sands to 100, 150 or even 200 mesh, before the values are released, but after this has been done, the pulp is simply passed over the amalgamating device, and the electrochemical forces automatically extract the values to such an extent that usually no further treatment is profitable. In ordinary cases, values are recovered at 80 mesh. In certain cases where the ore is unusually refractory, base or rebellious, it may be necessary to treat the tailings for an hour or two by the continuous electro-cyanide process, which is an exceedingly simple and inexpensive operation, but withal very efficient.

**Mode of Construction.**—The electrolytic method of amalgamating calls for a sluice box of suitable width, the length being 40 or 50 feet, or even longer, according to conditions. In the bottom of the box is an ordinary copper plate acting as a cathode. Graphite anodes of suitable construction are arranged to conduct the low voltage current into the water (electrolyte) passing over the device. Pulp of proper fineness, screened gravel or sand is passed into the apparatus by suitable means. Certain solutions are also added to the water. A critical low voltage current of proper amperage is passed into the anodes; the water, carrying pulp, etc., acts as an electrolyte, and makes the electric connection with the copper plate (cathode). In operation the water is at all times electrified and the copper plate is also constantly under electrical action. The device can be made of any desired capacity.

**Essential Elements of the System.**—So far as the electrochemical actions and processes are concerned, there are five cardinal conditions or points to consider:

- (a) The anodes.
- (b) The flowing body of water, pulp, slimes, etc. (electrolyte.)
- (c) The copper plate (cathode.)
- (d) Certain solutions added to the water: 1. Mercurial solution; 2. Sodium solution; 3. Hydrogen solution.
- (e) Low voltage current.

The anodes and cathodes are connected with a 5-10 volt generator in the usual manner; the usual volt meter rheostat and ammeter being in place. The current used has approximately the density of about five-tenths of an ampere per square foot of cathode surface.

In operating, the mercury solution is mixed with the water passing into the device. The amount of the solution, which is standardized, depending upon the values in the pulp. About the same amount of mercury is needed as in the ordinary practice. Practically all the mercury is recovered in the amalgam. Several chemical, electrical and electrochemical processes are constantly and simultaneously in operation. When the machine is once adjusted for given conditions, these processes and reactions are synchronous, automatic and mutually balanced, all of them combining perfectly to assist in the recovery of values. In this system, the various powers, affinities and laws of electro-chemics have been perfectly balanced and harmonized to produce certain desired results, and the system beautifully illustrates how nat-



ural laws may be used to serve mankind when intelligently adjusted and applied. A few more important reactions will now be mentioned.

**Intensified Chemical Action.**—All chemical action is greatly intensified under critical electrical conditions. Amalgamation is a chemical action, and the affinity of mercury for the metals is greatly quickened by the electrical current. The chemical processes described below are much more rapid and effective under the electrolytic conditions than they usually are. In a similar manner the action of a cyanide solution can be greatly augmented and intensified; in electro-cyanidation values are recovered which are refractory in the usual solutions; and the time of treatment is reduced to one or two hours, while the gold is recovered by electro-deposition in the form of amalgam.

**Deposition of Mercury.**—The even, constant and uniform deposition of virgin (nascent) mercury on the cathode plate is the crucial operation of the system. The mercury is deposited from the mercuric solution mentioned above by ordinary electrolytic action; an electroplating process is in operation, and we have the cathode plate covered with a bright, uniform and chemically pure coating of nascent mercury, which remains in a perfectly "healthy" state as long as working conditions continue. The deposition of mercury and the character of the amalgam are at all times under absolute control of the operator. The mercury coating or plating adheres tenaciously to the copper plate, and the passing volumes of water, sand, pulp, etc., have no effect upon it. With proper adjustment, no excess of mercury is possible, and no "floured" mercury is discernible in panning the tails. This coating or plating of mercury above mentioned will stand the action of a heavy volume of running water containing a full load of pulp; even water carrying a full load of magnetic iron has no injurious effect upon it.

The mercury deposited by electrolytic action is nascent or virgin mercury; its affinity for metals and gases is far greater than usual; its amalgam-forming powers are intensified to such a degree that rusty, greasy or pyritic gold is instantly amalgamated; platinum is absorbed as quickly as gold when sodium is present in the amalgam (see Sodium Amalgam). Grease, talc, silicious coatings or sulphurous conditions in connection with gold particles have no effect in preventing amalgamation, and "fouling" or "sickening" of the plate is impossible. The use of electrolytic amalgamation insures at all times a constantly bright, healthful and powerfully active mercurial surface, impossible under the usual practice. The behaviour of the mercury under electrolytic conditions is entirely different from its action in ordinary amalgamating practice; and conclusions based on the usual mill practice will not apply in the new method.

**Nascent Hydrogen.**—Hydrogen at the moment of its liberation from a compound is known as "nascent" hydrogen; the gas in this condition has much more powerful affinities than ordinary hydrogen; nascent hydrogen has increased powers as a reducing agent; it destroys instantly organic, greasy and foul conditions; it unites instantly with the oxygen of iron rust at ordinary temperatures, thus cleaning "rusty" gold; all impurities in the water are counteracted, and the action of nascent hydrogen on the mercury is such that fouling of the plates cannot occur. One authority states that in the presence of nascent hydrogen, mercury cannot "sicken" or oxidize or become sulphated.

The action of nascent hydrogen as a cleanser and reducing agent is used to advantage in the electrochemi-

cal amalgamator, and if the gold particles are unusually coated or rusty, additional volumes of hydrogen can be obtained through electrolysis by adding some inexpensive solution of potassium or sodium. Under the action of electrolysis, the mercury as fast as deposited, absorbs free hydrogen, which is occluded throughout the whole mass of mercury; large volumes of hydrogen are thus absorbed, and the gas is all the time exercising a powerful cleansing and reducing effect, and preparing the way for amalgamation. Mercury, which has absorbed hydrogen under these conditions, is in the best possible condition to form amalgams.

**Formation of Sodium Amalgam.**—When sea water is used in the electrolytic system of amalgamation, or when a solution of common salt, or some solution containing a sodium salt is mixed with the water entering the device, we have the deposition of nascent metallic sodium by electrolysis; nascent sodium is brought into contact with nascent mercury, and a sodium amalgam is formed, which is absolutely pure chemically; we may say sodium amalgam in its "nascent" state is formed, in which state it must always remain healthy; it also in this state, has a much stronger affinity for the metals than the usual sodium amalgam of the arts. Sodium amalgam will hold free gold in any condition; also platinum; at least hydrogen-sodium amalgam will amalgamate all metals not encased, which are in a comminuted state and sodium amalgam by electrolysis cannot be made without the presence of hydrogen. Free sodium also destroys organic substances, and acts as a general cleanser in the chain of operations.

**Hydrogen-Sodium-Amalgam.**—In Volume 1, Proceedings of the London Inst., Min. and Met., page 205, will be found an article by P. G. Warnford Lock, E.M., in which he describes the formation of hydrogen-sodium amalgam and mentions the powerful affinity between this amalgam and gold. In electrolytic amalgamation the hydrogen is formed in several ways:

- (a) By the electrolysis of  $H_2O$ .
- (b) By the electrolysis  $HgCl_2$ .
- (c) By the electrolysis of various salts, which may be used for the formation of hydrogen.

Part of the hydrogen liberated is occluded by the mercury forming hydrogen-sodium amalgam, and part is used in reducing oxides which form rusty coverings on gold particles; parts also act as a general cleanser and purifier as it escapes through the water. In leaving this paragraph, I would remark that in an amalgam of hydrogen, sodium and mercury formed under nascent conditions, we have a trinity of the most powerful amalgamating agents at present known, and amalgamation will take place even in the presence of silicious coatings, rusty, sulphurous, greasy, arsenical, pyritic conditions, or other adverse conditions which usually prevent amalgamation.

**Formation of Gold Amalgam.**—We have seen above how the presence of hydrogen and sodium prepares the way for amalgamation. So well has the work been done that amalgamation takes place as soon as a particle of gold touches the quickened mercurial surface. And it might be noted in passing that amalgam formed under the conditions which we have described (electrolytic amalgamation) is a different compound from the usual amalgam formed on mill plates. The amalgam as described holds to the plate very tenaciously as it is placed there by electrolytic action, and it is not easily dislodged. It is homogeneous, tenacious and free from foreign materials. Particles of amalgam under this system are not broken off by the passing volumes of



water. The larger particles of gold will come in contact with the mercury before passing many feet; microscopic values or float gold, or values in slimes will require a longer length of cathode surface; at times possibly 40, 50 or even 60 feet will be required, but any microscopic particles, or any of the values in slimes will be instantly arrested at the first contact with the mercurial surface. Microscopic values and fine particles of gold in suspension are coated with mercury the moment they enter the zone of electrical action, and the cataphoretic action of the electrical current assists in forcing them into contact with the mercurial surfaces. Experiment has demonstrated that electrolytic amalgamation will recover from 95 to 99 per cent. of all gold not encased, and in many cases the extraction reaches 100 per cent. Usually when the pulp of refractory ores is ground to 100-200 mesh, the tailings after passing the electric amalgamator, do not contain enough values to make any form of supplementary gold saving devices necessary.

**Electrolytic Amalgam.**—Amalgam found under the above described conditions is electrolytic amalgam or "nascent amalgam"; it is formed by particles of gold which have been cleaned and coated with an electroplating of mercury, coming into contact with nascent mercury. The resulting amalgam has entirely different qualities from the usual mill plate amalgam. Electrolytic amalgam is soft, smooth, homogeneous, elastic, tenacious yet plastic; it cannot be eroded by passing volumes of water and pulp; it does not crumble; it is never sulphated; it contains no foul conditions; it forms an ideal surface for the absorption of any passing particle of gold or amalgam; it is "alive," has the greatest possible affinity for gold, and no mill man ever saw a more beautiful and perfectly "healthy" amalgamating surface, for the electrolytic amalgamating surface is, metallurgically considered, the acme of perfection.

**Chlorine Gas.**—Nascent chlorine is liberated when common salt or bi-chloride of mercury are electrolyzed in solution; chloride water is formed; chloride under such conditions cleans and brightens gold by reducing the oxides; chlorine and hydrogen also unite to form hydrochloric acid which attacks all kinds of impurities attached to the gold particles. Chlorine gas is the most powerful bleaching agent known. It is possible that microscopic particles of gold in slimes may unite with chlorine or hydrochloric acid and form compounds, from which gold is liberated, and deposited on the cathode plate by electrolysis.

**Electrolysis of  $H_2O$ .**—The decomposition of water has been mentioned and the action of free hydrogen described. Nascent oxygen is liberated which also assists in preparing values for amalgamation. Oxygen in this state is a powerful enemy of organic substances, and foul, greasy or dirty conditions are quickly eradicated by its action.

**Mechanical Action of Gases.**—At all times there are liberated from every portion of the surface of the cathode free gases which arise upward through the water. These constantly escaping gases have a tendency to act as a cushion over the newly formed amalgam, which cushion prevents in a measure any scouring effect on the part of both sand or gravel, thus rendering the system equally applicable to stamp mills, placer mines, gold dredges and beach mining. Gravel and black sand can be passed over the device, and freed from all values, no matter how small, which may be present.

**Dynamic Electrical Action.**—The claim is made that a critical electrical current when properly adjusted tends to force all gold particles to the cathode plate, and that such current actually does carry microscopic particles into contact with mercury; and that the efficiency of this force depends upon density, voltage and proper adjustment of the device. There is considerable evidence to support this contention that there is a dynamic action in the electrical current which carries gold particles to the cathode. As a rule, all values are deposited in the mercury in the first ten or twelve feet of plates; and it is hardly reasonable to suppose that gravity alone would be sufficient to force every particle of gold into an amalgamating contact in such a volume of water as is used. If the necessary contact for amalgamation was the result of chance and gravity, it would be reasonable to look for an occasional colour in the tailings; but not only is it impossible to find a colour there by the most careful pannings, but it is impossible to find any value of importance by the most careful assay. In view of this fact, and other facts which have been noted, it is reasonable to suppose that there is a dynamic quality in the electric flow which acts directly upon metallic particles of gold; and as Madam Curie and other scientists have pronounced electricity to consist of material ions, this view is not entirely without foundation.

In the system of gold extraction above outlined amalgamation proceeds under the most favourable conditions that can be provided. Every obstacle is removed, and every force that tends to assist is intensified and reinforced. Not in a laboratory could a more positive action be obtained. Instead of leaving the amalgamating process to chance and the uncertainties of the usual practice with all attendant difficulties, we have in the process in question, the formation of amalgam carried on under ideal conditions, where the highest possible efficiency is attained; and it should be remembered that the processes are constantly striving to hold the amalgam in place, and to resist any erosive tendencies of the water and pulp. The amalgam coating is the result of the electroplating action of the device and the amalgam is forced into a perfect contact with the copper plate. In view of these facts it is not unreasonable to believe, that in the near future, electrolytic amalgamation will supersede the older methods, and at the same time vast fields will be open for the miner that are now beyond his means.

There are vast ledges and mountains of low grade and refractory ore, which, with the improved grinding machinery, in connection with electrolytic amalgamation may develop into immense mining fields. For locked up in the immense ledges and deposits of low grade ore, found in all gold-bearing countries, we have a treasure house containing values easily accessible, a thousand times greater than the combined wealth of the nations. When the limited supply of gold from the few high-grade veins is exhausted it is to these vast deposits that the world must turn for its supply of metals for monetary purposes.

The only special machinery required for the electrolytic system of amalgamation is a low voltage generator requiring from  $2\frac{1}{2}$  to 5 horse-power for operation. A 5-horse power generator will furnish sufficient current for the treatment of 500 tons daily.

Whenever the values are microscopic as in the case of slimes, or when the gold is extremely fine and flakey, it will be found that electrolytic mercury raffles or wells



will give excellent results. Electrochemical action can be easily obtained in connection with the standard Hungarian or Australian mercury wells; when such mercury riffles are electrically excited, there is no flouring

or fouling of the quicksilver, and no coating of sulphurets appears. Such riffles are also admirably adapted for recovering values in "black sand" and the fine values in placer and dredge tailings which are universally lost.

## AMERICAN INSTITUTE OF MINING ENGINEERS.

Written for the Canadian Mining Journal by E. Jacobs.

The 97th meeting of the American Institute of Mining Engineers was held at Spokane, Washington, on September 28-29.

The special train conveying the excursion party, which numbered about 60, left Chicago on September 16th, and after a tour through Yellowstone Park, Wyoming; and visits to Butte and Anaconda, Montana; and the Coeur d'Alene district, Idaho; Spokane was reached on the evening of Monday, 27th.

Owing to lateness of arrival, the opening session was postponed from Monday evening to the following afternoon, Tuesday morning having been occupied by attending the reception of President Taft by the citizens of Spokane. The sessions were held in the Masonic Temple. E. J. Roberts, chairman of the local reception committee, opened the meeting, and J. C. Ralston, city engineer, in the unavoidable absence of the mayor, who was in attendance on the President's party, cordially welcomed the visitors. He commenced his address by stating that mining commenced on the American continent when Ferdinand and Isabella of Spain grubstaked Columbus, and later said that within the last two months an Irrigation Congress had been held in Spokane, attended by 1500 delegates. In this connection he mentioned that the agricultural produce from the country tributary to Spokane had an annual value of about \$14,000,000. On the present occasion, including their Canadian friends, there were less than 150 delegates representing mining which, over the same territory as that just referred to, has an annual mineral production of a value of about \$40,000,000.

Dr. R. W. Raymond, at the request of Dr. D. W. Brunton, president of the council of the A.I.M.E., responded to the address of welcome, and in the course of a characteristically appropriate reply, alluded to the individual enterprise, skill, and courage of the typical mining engineer. One of the happy remarks made by the venerable secretary of the A.I.M.E. was that the mining engineer "should overcome the resistance of nature, including human nature, and one of the greatest resistances of human nature he has to overcome is the board of directors."

Dr. Brunton read his presidential address, which was on "Modern Progress in Mining and Metallurgy in the Western United States." Those who took part in the lengthy discussion which ensued were: Prof. Wm. Kent, Charles Catlett, Dr. W.O. Snelling, E. S. Hutchinson, Chas. W. Goodale, W. L. Saunders, Ernest Levy (Rossland, B.C.) and Thomas Kiddie.

The evening session was opened by the reading of Dr. Brunton's paper on "Modern Practice of Ore Sampling." During the discussion that followed, Thomas Kiddie read his paper on "Causes of Variations in Ore Sampling," which he had presented at the meeting of the Canadian Mining Institute held the previous week in Nelson, B.C. A paper by Franklin Bache, Fort Smith, Ark., on "Dust Explosions in Coal

Mines," was read by the secretary, and after discussion an adjournment was made until next morning.

On Thursday morning the third and final session was held. This was a joint meeting with the western branch of the Canadian Mining Institute, so Dr. Brunton courteously invited Thomas Kiddie, chairman, and E. Jacobs, secretary of the branch, to sit with him on the dais. A paper on "The Ruble Hydraulic Elevator," by J. McD. Porter, Spokane, was first read, and was discussed by Professor Kent and Dr. Raymond.

In the paper, "How may we Conserve our Coal Supplies," by Edward W. Parker, Washington, D.C., the writer, after alluding to the almost universal interest lately manifested in conservation, offered a few suggestions regarding the possible necessity of some restraint or control of the coal mining industry, with which he had been somewhat closely associated for the last 20 years. Passing reference was made to the suits brought by the Government against the anthracite operators in Pennsylvania, and the opinion was expressed that the present situation in the anthracite region has been developed through sheer necessity if the conservation of the supply of anthracite and the prolongation of the life of the fields in the best interests of the people is to be attained in any other way than through Government control, which latter does not seem to be materializing. The past profligate waste in anthracite mining has only been remedied by the close control and conservative management brought about in recent years, due in no small measure to the efforts of Dr. Raymond, Eckley B. Coxe, P. W. Sheaffer, Franklin B. Gowan, William Griffith, and a few others, through whose efforts many reforms in the lessening of the waste of anthracite were effected. Under conditions prevailing prior to 1887, when the anthracite coal commission made its report, it was estimated that for every ton of coal mined and sold, 1 1-2 tons were lost—much of this in pillars left to protect the workings, and millions of tons of small coal or screenings thrown on the culm banks. Improved methods of mining and preparation have of late years reduced the percentage of waste, so that at present the recovery will average about 60 and the loss 40 per cent., while by means of washeries much usable coal is being saved from the culm banks.

While the securing of the close control existing in the anthracite region of Pennsylvania has been made possible by the comparatively limited area of the fields (less than 500 square miles, with conditions ideal for a natural monopoly), it is different with the bituminous fields. The latter are scattered over some 30 different States and Territories; they aggregate about 250,000 square miles in area, exclusive of approximately equal areas of lower grade coals and lignites; and are for the most part so easy of access that frequently but a small amount of capital is necessary to develop a mine. In 1907, its banner year of industrial activity, the United



States produced nearly 400,000,000 tons of bituminous coal (including about 8,250,000 tons of sub-bituminous coal and lignite). In 1908, in spite of the business depression, the production was 332,500,000 tons. If the railways were to supply cars and motive power it would be practicable to produce from mines already open 600,000,000 tons of coal annually, and this without working Sundays or holidays to do it, but the markets could not absorb this larger quantity, which if we produced would create a surplus and cause general demoralization in values. Yet new properties are being opened and demands made upon railway companies for additional transportation facilities. One effect is to scatter the miners, reducing the supply of labour and curtailing the productive capacity of the older mines, the reduction of output meaning increased cost of operation and the risk of closing down as unprofitable before all the available coal has been extracted from these mines. Under the existing system of government and control over mining operations, there does not seem to be any effective way of curbing the tendency to new development or protecting capital already invested in the industry, nor is there any hope that State legislatures will plan any restrictions upon the industry which will discourage new development. Yet every new mine opened has its influence on the creation of a surplus, which, while it may seem desirable to those who clamor for cheaper coal, is ultimately destructive of industry, lowers wages, and makes necessary the practice of economies that are prejudicial to safety, to life and property in the operation of the mines.

While the suggestion that the bituminous mines should be put under some sort of Government control is bold, the opinion was frankly expressed that before many decades it will be necessary, for the protection of capital already invested, to secure control by private enterprise certainly of the areas containing the higher grades of coal, and to regulate the production according to market requirements. The choice of three evils would seem to be open: (1) The continuation of existing conditions—a feasting for to-day and remorse for to-morrow; (2) ultimate control by a combination of interests that will make the “hard coal trust” appear insignificant, and the “water power trust” of even less importance; and (3) governmental supervision and regulation—not ownership, however. The first will continue to be bad, the second would be worse, the third is problematical. Control by the several States may be suggested as a fourth, and best, alternative, but under competitive conditions referred to it is not to be expected that the States will undertake to restrict developments in their respective jurisdictions any more than they will enact legislation restricting the miner in his personal liberty.

Apropos of the personal liberty of the miner, it was mentioned that not the least difficulty experienced in operating a coal mine is the enforcement of necessary discipline among the mine employees. The concluding part of the paper dealt with accidents and disasters in coal mines, and the frequent tendency to carelessness on the part of miners, which in some cases results in much loss of life.

E. Jacobs read “Notes on the Coal Resources of Southeast British Columbia and of Alberta.” He prefaced his subject by briefly reviewing the situation relative to the occurrence of coal in the northern parts of the United States and contiguous southern parts of Canada, showing that there are extensive areas of the latter country which now obtain, and will continue to

do so, their supply of coal from the States, and vice versa, there are parts of the States the most convenient and economical sources of fuel supply of which are in Canada. The desirability of free trade or reciprocity in coal between the two countries is, therefore, self-evident, duty on coal being a tax on industry, which hits consumers on both sides of the international boundary line, without giving any compensating advantage to either side. Generally, the position seems to be this: There is an enormous quantity of coal of excellent quality in Canada—in the Maritime Provinces, in the east; and in British Columbia and Alberta, in the west—but practically none in about 2000 miles of territory situated between Alberta and New Brunswick. On the other hand, there is no coal in the north-eastern States; none thence, immediately south of the international boundary line (excepting in Michigan) until North Dakota is reached, and here lignite coal occurs; then there is coal in the Rocky Mountain region—in Montana and Wyoming, and again coal (though not of nearly so good quality as that in British Columbia and Alberta) in the State of Washington. So it would appear, in these circumstances, that the natural position would be for the Maritime Provinces of Canada to be the chief source of fuel supply for the New England States, and for Alberta and British Columbia to stand in similar relation to the Pacific States, while Pennsylvania and other States’ coalfields should supply Ontario and adjacent portions of the other Canadian Provinces that lie immediately east or west.

The immense coal resources of south-eastern British Columbia and Alberta were indicated by numerous quotations of facts and figures from reports of officials of the Geological Survey of Canada—Dr. Selwyn, Dr. Geo. M. Dawson, D. B. Dowling, W. W. Leach, and Jas. McEvoy—and from other published accounts of these coalfields. Of the Crow’s Nest coalfield, in British Columbia, the late Dr. Dawson wrote (for the “Mineral Industry,” to the end of 1898, p. 200): “This field, although it has not yet been fully defined, must have an area of at least a couple of hundred square miles. There are numerous superposed seams, ranging in thickness from 2 to 30 feet, and although the whole series, supposed to comprise about 20 seams, covers only the central part of the field, it is already manifest that we have here one of the most remarkable coal basins known. Dr. Selwyn roughly estimated the coal underlying each square mile, in one part of the field, at 49,952,000 tons. Later explorations by Geological Survey officials and others have led to the discovery of other very important occurrences of coal, some of which appear to warrant the expectation that extensive development will disclose the existence of an enormous tonnage of bituminous coal suitable for steam or coking purposes.

Among other information quoted relative to coal in Alberta was the following (taken from an article by D. B. Dowling, in “Economic Geology,” vol. iv., No. 1, Jan.-Feb., 1909): “The coal is found in three distinct horizons in the Cretaceous . . . . The estimate of area and coal content for these three formations may be summarized from the foregoing information thus:

|                                 | Sq. Miles. | Million Tons. |
|---------------------------------|------------|---------------|
| Kootanie formation . . . . .    | 288        | 7,930         |
| Belly River formation . . . . . | 6,000      | 26,000        |
| Edmonton formation . . . . .    | 12,800     | 71,000        |
| Total . . . . .                 | 19,008     | 104,930       |



As an example of the quantity of coal a single company is estimated to possess, the following was taken from a report, by Jas. McEvoy, of the coal lands held by the German Development Company, Limited, of Ottawa, organized about two years ago: Kananaskis coal lands—area, 7 7-8 sq. miles or 5040 acres; 10 workable seams of coal aggregating over 70 feet; estimated total quantity of coal on the lands, 519,750,000 tons, of which 75 per cent. can be actually taken out, or 4000 tons a day for over 320 years. Bighorn coal lands: Area, 5 sq. miles or 3200 acres; 124,000,000 tons of coal, or at least 2000 tons a day for 175 years. Brazeau coal lands: Area, 4 sq. miles or 2560 acres; at least 198,000,000 tons of coal or 4000 tons a day for over 140 years. These lands are all in the western part of Alberta.

Brief particulars were given of anthracite mining at Bankhead and Canmore, Alberta, of the big breaker, and the coal briquetting plant at Bankhead; of the operations of a number of bituminous mines in the Blairmore-Frank district; of an enormous deposit of coal at the Corbin mine, in the Crow's Nest Pass district, where a thickness of quite 200 feet of clean steam coal occurs; coke making, in either beehive or Belgian ovens, at Fernie, Hosmer, Michel, Coleman, and Lille; and of modern tipples, power plants, general equipment and mining methods, at various collieries in the region under notice.

The last paper read was one by W. D. L. Hardie, of Lethbridge, Alberta, on "The Galt Coal Field." This field was described as extending from where the St. Mary River joins the Belly River, above Lethbridge, to Grand Forks, at the Bow and Belly Rivers, below Lethbridge; the workable and merchantable coal spreading out about two miles on each side of the Belly River. Throughout the merchantable area the coal averages 4 feet in thickness, though in the neighborhood of Lethbridge it averages 52 in. There are two distinct seams, almost invariably divided by one to two inches of fire-clay, or a streak of bone coal one to six inches thick.

Assuming that the coal extends only two miles on each side of the river, that it is 4 feet thick, and that the distance from the St. Mary to the Grand Forks is 75 miles, the area will produce, making liberal allowances for loss of coal in mining, 1,253,376,000 tons. Besides this main area, there are several known detached areas, and others are likely to be discovered.

An average of several analyses gives the following: Moisture, 7.75%; volatile matter, 30.72%; fixed carbon, ash, 10.71 per cent. These analyses, however, do not show the percentage of hydrogen in the volatile matter. Before the opening of the Crow's Nest field this coal was largely used by the Canadian Pacific Railway, in locomotives and stationary plants. There is still a heavy demand for coal.

At the present time there are plants in operation of a daily capacity of 4,000 to 5,000 tons of Galt coal, and others are under construction which in a few years will double this daily output. One of the finest coal handling plants in Canada is now being installed at the Galt No. 6 mine, where two shafts have been sunk to a depth of 410 feet—one a hoisting shaft 20 ft. 2 in., by 21 ft., 2½ in., and the other an air shaft 20 ft., 8 in. by 10 ft. in the clear, both timbered with 10x10 in. square sets, backed with 3-in. plank.

Following the reading of these papers, numerous questions were asked concerning mining in British Columbia. These were replied to by W. Fleet Robertson, of Victoria, Frederic Keffer, Greenwood, and

Thomas Kiddie. Prof. Milner Roberts, dean of the school of mining, at Washington State University, Seattle, gave some information relative to the Nicola Valley coal field, B. C., and Prof. F. A. Thomson, chief of the mining engineering department at the State College, Pullman, Wash., spoke on mining in other parts of British Columbia.

Before adjourning the meeting, Dr. Brunton thanked the Canadian visitors for the part they had taken in making the joint session of the two institutes interesting.

While in Spokane and vicinity, opportunity was afforded the visitors of inspecting the several hydro-electric and steam generating plants of the Washington Water Power Company. These are: At Post Falls, 6,600 kw., 11,500 h. p., height of fall 55 feet; at Spokane 8,250 kw., 11,000 h.p., height of fall 75 feet; total fall in the city, 144 feet. The steam plant in Spokane is 15,000 kw., 20,000 h.p. The new plant, in course of erection at Little Falls, is four 5,000-kw. units—20,000 kw., 27,000 h.p., height of fall 68 feet. The new W.W. P. sub-station at Post Street is for transforming and distributing 30,000 kw. The voltage of the high-tension transmission line to the mines in Coeur d'Alene district is 60,000 volts. The plant of the Inland Empire railway system at Nine Mile has a capacity of 6,000 kw. A number of the party examined a large and representative mineral exhibit, which had been left intact from the annual exhibition held a week previously. A few visited the tin mine, near Spokane. It is noteworthy that a badge presented to the visitors was made from Spokane tin.

A complimentary banquet to the visitors, tendered by the leading citizens of Spokane, was held on Wednesday evening; at this covers were laid for 200. On Thursday the A.I.M.E. party proceeded to Seattle, to visit there the Alaska-Yukon-Pacific Exposition.

The sixth general meeting of members of the western branch of the Canadian Mining Institute, was held at Nelson, B.C., on Saturday, September 25. Thomas Kiddie, chairman of the branch, presided, and there was a fair attendance of members and visitors.

#### Chairman's Address.

After calling the meeting to order, the chairman said: "You will remember, gentlemen, that it was here in Nelson, on Jan. 15, 1908, this branch of the Canadian Mining Institute was organized. The branch started with a membership of about 130, and the expectation then was that by the end of 1908 the number would be increased to 200. This was practically realized, but not quite; to-day, however, there are on the printed list of branch members 197 names, while several more are before the council for enrolment, so that we may now claim 200 as the number of members of the branch.

"It gives me much pleasure to welcome in Nelson to-day, Mr. R. W. Brock, director of the Geological Survey of Canada; also Mr. W. F. Robertson, provincial mineralogist for British Columbia. Both are valued members of the institute and active members of its council, and Mr. Robertson is the present senior vice-president of the institute. The Geological Survey, during many years past, has done and is continuing to do, valuable work in the west as in other parts of the Dominion—in Alberta, with its immense coal fields, now attracting increasing attention; in the Yukon, where there are coal and lode mines, as well as large areas of gold-bearing gravels for placer mining, and in British Columbia. In this province particularly the Survey is extending its useful work—this season in Sheep



Creek and the Slocan (in both of which the city of Nelson has considerable interest); in the big Similkameen district on Vancouver Island, and in the Skeena country in the northern part of the province. I hope Mr. Brock will this morning give us the benefit of hearing from him something relative to the excellent work his department is doing in the west, which is indeed fortunate in having as director of the Survey so good a friend to it as he is known to be—one with an intimate and practical knowledge, obtained during years of field work in this western country, of its great promise of immense mineral wealth, and who, further, is believed to be thoroughly in sympathy with the West. Again we are fortunate in that the Dominion minister of mines is a western man and a representative of a British Columbia constituency, so that this province may confidently look for the continued consideration of, and derive much benefit from, the work of the Geological Survey branch of the Dominion Department of Mines."

In the course of his opening address the chairman first called attention to the satisfactory increase in the number of western members of the institute, there now being about 200, as compared with 130 when the branch was organized in January, 1908. He next extended a cordial welcome to R. W. Brock, director of the Geological Survey of Canada, and W. Fleet Robertson, provincial mineralogist for British Columbia, both of whom had come to Nelson to attend the meeting. The valuable topographical and geological work the Survey has done and is continuing to do in the west was mentioned in terms of appreciation, as, too, was that of the British Columbia Bureau of Mines under the direction of the provincial mineralogist. Reference was next made to the forthcoming joint session of the western branch of the Canadian Mining Institute with the American Institute of Mining Engineers at Spokane, and the opinion was expressed that the reading in that city of papers on the coal resources of south-eastern British Columbia and Alberta, and the discussion that would follow, must prove of material service to the coal mining interests of the great coal districts to have the attention of the joint meeting. The sterling good work the Nelson Board of Trade is doing in furthering the interests of mining among other district industries was suitably acknowledged, and thanks were expressed for the kind courtesy of that body in placing its rooms at the disposal of the institute for the purpose of holding that day's meetings.

"It is also gratifying to see here Mr. Robertson, whose duties as provincial mineralogist have unfortunately heretofore prevented him from attending the meetings of the branch. Last autumn he made a special effort to get back to Victoria in time to be present at our meeting there on the occasion of our welcoming to the province the Canadian Mining Institute summer excursion party, which included many notable men from Europe as well as prominent geologists, mining engineers and metallurgists of North America. Notwithstanding, though, that a canoe journey of hundreds of miles was taken, Mr. Robertson was unable to reach Victoria while our meeting was being held, though he did succeed in arriving at Vancouver in time to spend a day there with our distinguished visitors. I am glad to find him this season engaged in doing field work in East and West Kootenay and I have no doubt these districts will be gainers as a result of his investigations.

"I have much pleasure, too, in mentioning the forthcoming joint session of this branch with the American Institute of Mining Engineers, to be held at Spokane,

Wash., next week, and I am hopeful quite a number of our members will be able to go to that city to attend the meeting and to assist in welcoming the A. I. M. E. party to the west. It is a matter for regret that that meeting has interfered to some extent with the attendance here to-day, but there are some of our busiest members who cannot spare sufficient time to admit of their attending both the Nelson and Spokane meetings, so they have chosen the latter. We cannot fail to realize that the reading in Spokane of papers on the coal resources of south-eastern British Columbia and of Alberta, and the discussion that will follow, must prove of material service to the coal mining interests of the great fields situated to the east of the metalliferous mining district in which we are to-day.

"On behalf of this branch I desire to express our appreciation of the thoughtful courtesy of the Nelson Board of Trade in placing at our disposal its rooms for the purpose of holding our meeting to-day. This board is doing sterling good work in directing widespread public attention to the great natural resources and advantages of the Nelson district. Its efforts in furthering the interests of those engaged in the mining industry are deserving of our thanks, and we, as members of the Canadian Mining Institute, may well express our thanks for the benefit the mining industry, among others, is deriving from the well-directed efforts of the board. By preparing the useful pamphlet on mining, copies of which are at your disposal to-day; by the very creditable displays of ores made at the Alaska-Yukon-Pacific Exposition, and at the respective exhibitions at Toronto, Spokane and here in Nelson, the mineral resources of the Kootenay are being well advertised by this board, and we take pleasure in expressing our appreciation of the value of the work thus being done."

E. Jacobs, of Victoria, B.C., secretary of the branch, then read the following review of the progress of mining in the province during the expired months of the current year.

"The third quarter of the year closes with the mining industry of British Columbia on the whole in a satisfactory condition. In most of the districts that contribute to the annual mineral production of the province there is activity at the mines, and in some the outlook is more promising than earlier in the year. Work has been resumed on several properties that had been inoperative for a more or less lengthy period, and in other instances development work has been undertaken that will probably eventually result in adding to the number of producing mines.

"Taking the economic minerals separately, the following comment is made:

"Gold.—While it is yet early to make an estimate of the quantity of placer gold produced this year, the opinion may be expressed that an increase over last year's production may not reasonably be looked for, the gravel-washing season having been opened later than in some years with the resultant comparatively short period of operation at the more important placer mines. Then there was the carrying away of the North Columbia Company's dam at Surprise Lake, in Atlin camp, which prevented as large a recovery of gold as would have been made had the expected increased quantity of water been available for hydraulicking. In Cariboo Mr. John Hopp, who operates on a larger scale than any other placer miner in that district, had a satisfactory season, his gold returns having been good for the time worked. The close of the season was occupied by Mr.



Hopp in making dams and other provision to secure an enlarged supply of water for future operations. Mr. H. W. DuBois, of Philadelphia, U.S.A., let a contract late in the season for ditch and flume construction to provide a water supply for another Cariboo property. Mr. J. B. Hobson spent the season in the Quesnel Forks district, but no information concerning his operations has yet been made public. Other placer miners, both individuals and companies, worked in Cariboo and Atlin camps and on a smaller scale in North-east Cassiar and East Kootenay. Not much information was published relative to the Ingenika field, from which a good yield of gold had been expected. Dredging for gold, of which very little has been done in the province during quite recent years, is to be tried again, the holders of dredging leases on Fraser River above Lytton having made arrangements after having prospected their gold-bearing gravels, to install dredging plant believed to be adapted to local conditions and capable of being operated profitably. Before turning from placer gold, mention should be made of the fine collection of nuggets from Yukon and British Columbia placer fields purchased lately by the Dominion Government and placed on exhibition at the Alaska-Yukon-Pacific Exposition, Seattle.

"The outlook for an increasing production of lode gold is considered favourable, both at mines where gold is the chief valuable constituent of the quartz or other ore, and where it is associated with copper. The recently reported sale of the Nickel Plate group and 40-stamp mill in Hedley camp, Similkameen, is regarded as indicative of more activity there, while at several smaller mines in the same camp steady progress towards regular production has been made. The provision of railway transportation facilities for this district will probably give an impetus to mining and consequently mineral production to an appreciably large extent. In Nelson mining division, which embraces the gold camps in the near vicinity of the town of Nelson, and those at Ymir, Salmo, Sheep Creek and Erie, there has been substantial advancement in lode-gold mining during the current year, and it is expected that there will be a steady increase in the output of gold from this district. Important developments have recently taken place at the Queen mine, Salmo, and as well at several of the Sheep Creek properties. Prospecting in Summit camp, situated between the Salmo district and Kootenay Lake, to the eastward, has given encouraging results. Another discovery of gold quartz in Cariboo district has lately been reported, but its importance has yet to be determined.

"Silver.—There does not appear to have been much change in conditions relative to the production of silver in the province. Slocan and Ainsworth mines have continued to contribute to the total of production, and the St. Eugene at Moyie Lake has steadily maintained its output of this metal from its considerable production of lead-silver. In smaller quantity silver has come from mines in Nelson division; also from the Lardeau, chiefly from the Silver Cup group in Ferguson camp. Portland Canal district and some claims in the Skeena country, on which silver-bearing ore has been found, may be expected to add to the silver production later, but as yet they are non-producers. The copper mines of the Boundary and Rossland camps, and in much smaller degree those of the Coast district, yield a considerable proportion of the annual output of silver, which occurs in many of the mines in association with copper and gold. At the Marble Bay mine, on Texada island,

the quantity of silver found in the copper ore has become greater as depth has been reached, the ore at between 800 and 1,000 feet depth averaging higher in silver than nearer the surface.

"Lead.—East and West Kootenay mines still produce practically all the lead included in the total mineral production of British Columbia. The St. Eugene, in the former district, and the Blue Bell and Whitewater, in the Ainsworth division of West Kootenay, are the larger producers. Work has lately been resumed on the Sullivan group, in East Kootenay, so that this property may be expected to put out shortly a fairly large quantity of lead. Other mines contributing more or less to the total lead production are the Rambler-Cariboo, Richmond-Eureka and several others in Slocan district; the Silver Cup at Ferguson, and the Emerald at Salmo, while lead is also obtained from concentrates from mines in Nelson and other divisions.

"Copper.—The Boundary is the chief source of copper in British Columbia, and indeed in Canada. The mines in that district of the Granby, British Columbia Copper, and Consolidated Mining and Smelting companies, respectively, are regular producers on a comparatively large scale, the Granby being far in the lead with the British Columbia Copper Company next. The mines of the last-mentioned company were idle during several months of the year, while the Granby operated with little or no interruption. The Consolidated Company closed its Snowshoe mine for a time but lately the output of ore from that mine has been larger than during most earlier periods of its history. Several smaller mines in the Boundary have been worked, notably the Bruce at Midway, which shipped 210 tons of ore to the British Columbia Copper Company's smelter at Greenwood, but on the whole the production of these has been small. The total production of ore from all Boundary mines has been about 1,000,000 tons for the nine expired months of 1909, of which approximately 700,000 tons was from Granby, 200,000 tons from the British Columbia Copper, and 100,000 tons from the Snowshoe.

"Rossland camp, with a total production during the same period of 170,000 to 180,000 tons of ore, has been the only other large producer of copper this year. Of the quantity mentioned, nearly 130,000 tons came from the Centre Star group of mines, owned by the Consolidated Mining and Smelting Company of Canada, Ltd., while the Le Roi No. 2 mined well on for 40,000 tons, and the Le Roi between 7,000 and 8,000 tons. The last-named mine is now at work again, doing development and diamond-drilling only, after a suspension of about six months.

"There appears to be a prospect of Kamloops properties next year adding to the copper production of the province, but during the current year their output has not been considerable.

"In the Coast district copper mining has been quiet on the whole, though the outlook for a marked improvement is considered encouraging. The chief exception to the general non-productiveness was Texada Island, where the Marble Bay mine in particular made an excellent showing, having developed a valuable deposit of bornite ore down to nearly 1,000 feet depth. The Tye Copper Company was operating the Indian Chief group, at Sidney Inlet, west coast of Vancouver Island, for a time and shipped a quantity of ore of good grade to its smelter at Ladysmith. Outside of this, though, copper mining on Vancouver Island has been of little importance for some time past. The smelter at



Crofton has been idle for many months, production at the Britannia mine, on Howe Sound, from which it obtained its chief supply of ore in recent years, having been very much reduced, and the smaller quantity of ore and concentrate having been sent to Ladysmith for reduction. The Swayne group, in Lynn Creek camp, near Vancouver, has been steadily developed, latterly by the Tyee Copper Company. While the supply of local ores has been small this year, that from south-east Alaska has been considerable, and from that source has come most of the 45,000 tons smelted by the Tyee Copper Company at Ladysmith during the twelve months to August 31st last. Prospects appear good for a substantial production of copper ore from properties on Moresby Island of the Queen Charlotte group. It is stated that the Ikeda mine, operated successfully by the Awaya-Ikeda Company, of Vancouver, is under option to Scottish capitalists. Incidentally it may be mentioned that Vancouver men are giving attention to copper properties on Texada Island, with a fair chance of success.

"The completion of a railway into the Similkameen country may bring about a decided improvement as regards copper mining in that district, lack of economic transportation having heretofore prevented the development of the industry there.

"Zinc.—Despite the higher tariff charges on zinc going to the United States, there has been a larger quantity of zinc ores and concentrates shipped from Slocan and Ainsworth mines to the States during the current year than in the corresponding period of 1908. Most of this has been from the Lucky Jim mine, in eastern Slocan. Other producers of zinc have been the Blue Bell and Whitewater group, in Ainsworth division, the Ruth at Sandon, Slocan and several other mines.

"Iron.—There has been no recent production of iron in British Columbia. From time to time somewhat glowing accounts of the occurrence of iron ore in large quantities on Vancouver Island in particular, have been published, but these have generally been indefinite and not supported in important detail by well-known and competent iron mining men. The preliminary report of Einar Lindeman, a Swedish iron ore expert employed by the Dominion Government to ascertain local conditions relative to the occurrence of iron ores, their manufacture and sale of the product, is the only published official information of comparatively late date available for reference. As a matter of fact there has as yet been comparatively little development of the iron ore deposits, so the permanence or otherwise of the supply remains, under these circumstances, undetermined. Meanwhile, though, there is good reason to think that genuine efforts are being made to establish on the coast of British Columbia a plant for the manufacture on a commercial basis of iron from local ores. Whether this desirable object can be accomplished remains to be seen but if it be brought about it will not be as a result of existing extensive development of the ore deposits, since on Vancouver Island they are still largely undeveloped. Better conditions obtain, though, at the Iron mine, Texada Island, where there has been considerable development and a fair amount of ore production.

"Coal.—Coal mining operations in British Columbia were enlarged during 1908 and 1909 and are still being extended, both on the mainland and on the coast. In the Crow's Nest Pass region both the Crow's Nest Pass Coal Company and the Hosmer Mines, Ltd., are main-

taining a large output and the Corbin colliery, in the same district, is steadily increasing its production. The extensive coal seams of the upper Elk River are awaiting the construction of a railway to admit of their shipping coal, of which there is a large tonnage available, and that of excellent quality. In Nicola Valley the mines of the Nicola Valley Coal and Coke Company, of Vancouver, are again producing, labour difficulties having been arranged. Other companies operating in the same district are preparing for regular production. The promised early completion of a railway to Princeton, Similkameen, has encouraged the Vermillion Forks Mining and Development Company to arrange for additional equipment for its coal mine in that neighborhood, so as to be able to soon ship coal continuously. On Vancouver Island both the old established companies, the Wellington Colliery Company and the Western Fuel Company, have produced much coal this year, while the South Wellington Coal Mining Company has built a railway to tidewater and constructed coal bunkers and other shipping facilities, which have allowed of its entering the market for the sale of its coal. Two or three important coal land deals for Vancouver Island properties, have lately been made, and it is expected that the opening of other coal mines will eventually be the outcome of these."

After E. Jacobs, of Victoria, secretary of the branch, had read a review of the progress of the mining industry of the province during the expired months of the current year, an adjournment was made to allow members to join members of the Nelson Board of Trade in welcoming Sir Thomas Shaughnessy, president of the Canadian Pacific Railway Company, who had just arrived in the city, and afterwards to inspect the comprehensive district mineral exhibit at the Nelson Exhibition closing that day.

#### Paper on Ore Sampling.

On reassembling after lunch Thomas Kiddie read a paper on "Causes of Variations in Ore Sampling." After stating that, so far as he knew, there is not any regular or standard method of determining the accuracy or otherwise of various approved mechanical ore samplers in use, and expressing the opinion that in the interests of both sellers and buyers of ores there should be sizing as well as chemical tests to determine whether there are important variations in the results obtained by standard samplers and sampling methods, Mr. Kiddie submitted a number of tables showing the results of numerous experiments he had made in the separation of metallic sulphides from silicates (or quartz) by the gradual crushing of sulphide ores, having a hard gangue, from  $3\frac{1}{2}$  to  $\frac{3}{8}$  in. approximately. These indicated that the proportions of certain constituents in the ores always increased while others decreased as the size of the portion dealt with in these sizing tests increased. Generally, the percentage of silica and alumina increased with the size of the ore, while the gold, silver, copper, iron, and sulphur decreased as the lumps of ore were larger. Applying this principle, a standard sampler was tested, with the result that it was found there was an appreciably large difference in the sizes of the ore discharged on opposite sides of the sampler, the variation indicating a possible source of serious error which may occur in determining the actual values of ore sampled by a riffle sampler. Another table showed the difference in results from sampling by riffle and cone methods, respectively. It was claimed that from the chemical analyses and the results of sizing tests exhibited by the tables submitted, there were great dif-



ferences in the metallic contents of the various sized particles of ore, and a consequent considerable variation in results obtained by present methods of sampling. Mr. Kiddie suggested that to prove the accuracy of sampling machines or methods of sampling it would be necessary to make up a sympathetic or artificial ore, the composition of which as regards sizes and contents of its component particles to be definitely ascertained, and then compared with those originally obtained from the sample. It was recommended that these determinations be made by a commission, or by the faculty of a school of mines or like institution. Mr. Kiddie called attention to the fact that his investigations had been in connection with one class of ore only. He mentioned that Dr. J. Bonsall Porter, of McGill University, Montreal, had read his paper, offered suggestions, and kindly undertaken certain work in further pursuit of this investigation; also that the results obtained will probably be given in a future paper to be prepared by Dr. Porter and himself jointly.

The subject of the paper was discussed by Messrs. W. F. Robertson (who incidentally suggested that the tables be produced in graphic form), E. W. Widdowson, M. J. Connolly, and others. A hearty vote of thanks was accorded to Mr. Kiddie for his interesting and valuable paper.

#### Other Business.

A paper on "The Galt Coal Field," prepared for the Spokane meeting by W. D. L. Hardie, of Lethbridge, Alberta, manager of the Alberta Railway and Irrigation Company's Galt collieries, was read by the secretary, and a vote of thanks to the writer was passed.

The death of Andrew Colville, a western member of the institute, formerly superintendent of the Crow's Nest Pass Coal Company's Coal Creek colliery, was reported by the secretary.

There was some discussion concerning an advertisement appearing in an Albertan newspaper relating to an alleged fraudulent mining company, and the secretary was instructed to refer the matter to the council of the institute for such action, if any, as that body shall think advisable.

It was decided to hold the next general meeting of the branch, due about the middle of January, 1910, in Vancouver B.C.

### INSPECTION OF MINES.\*

By J. A. Holmes, U. S. Geological Survey.

Mine inspection is and should remain a function of the State. It has for its purpose the proper execution of state mining laws; and the object of these laws is primarily the safety of the miners, incidentally the protection of mine property.

The agent of the state in the carrying out of these laws is the Inspector of Mines, and his assistants. These should be sufficient in number for frequent and thorough inspection; the basis for selection and continuance in office should be fitness for office and efficient service. They should be independent of political or other extraneous influences. They should receive compensation for services commensurate with the responsibility resting upon them, and the experience and technical training required. They should have reasonable laws to execute. They should have the willing co-operation

of both operators and miners in carrying out the provisions of the law. Under such conditions men of the best type will accept and hold these positions; and their actions will receive the support of public opinion and of the courts.

This inspection by officers of the state, whenever practicable, should be supplemented by the work of special inspectors employed by the mining companies. Many such companies have already adopted such a practice and report favourable results. In other coal mining countries this practice has become much more general. But in recommending to American coal operators the adoption of practices found successful in other countries, it should be remembered that the selling price of coal at the mines in the United States is generally less than half that in other countries; and this fact may render impossible here many improvements in behalf of safety and efficiency that the American operator would otherwise be glad to inaugurate.

The function of the Federal Government in connection with mine operations is one of inquiry and research, having in view two fundamental purposes:—

1. Greater safety for the lives of miners; and
2. The conservation of mineral resources.

In connection with ordinary mine inspection the special service rendered by these investigations will be:—

(a) The development of data such as will serve as a basis for the enactment of reasonable laws, rules and regulations;

(b) The establishment of facts which may serve as a basis for the settlement of disputes between inspectors and operators and operators and miners, either by courts or boards of arbitration.

The propriety of having such inquiries and researches conducted by the Federal Government in relation to mining will scarcely now be questioned in view of the fact that such policy has long since been accepted in relation to agriculture, forestry, fisheries, and other industries. But it may be added that the practice avoids extensive duplication of labour and expense by the states; the Federal investigations naturally cover a wider field of experience, including also experience in other countries, and the results are likely to be more generally accepted as impartial, being further removed from local influences.

Under such an arrangement there will be no basis of conflict between the State and Federal interests—no encroachment of one on the duties or rights of the other. The support of the Federal work will depend upon its securing and maintaining the good-will and co-operation of the state's inspectors; and the success of both the State and Federal work will depend upon their securing the proper friendly co-operation of the miners and operators.

Nor is anyone now likely to question the proposition that the conservation of resources is a national as well as a state problem. In the mining, treatment and use of mineral products no state boundaries are involved. An ore mined in one state may be milled in another, smelted in a third, refined in a fourth, and used in many different states. The coal mined in Pennsylvania or West Virginia may serve as a basis of heat, light, power for various manufactories in a dozen or more different states, and may be essential to the interstate transportation of mails, passengers and freight, while the manufactured products to be transported may in turn serve as an essential basis of other industries in the remotest parts of the country. The iron ore of Minnesota may in Illinois be mixed with coke from Pennsylvania and

\*An address delivered before the American Mining Congress Goldfield, Nevada, October, 1909.



limestone from Indiana, to be fabricated into steel to serve as frames for buildings in San Francisco, or New Orleans, or Boston, or as railway bridges across the Columbia, the Mississippi, the Hudson or the Nile.

The products of the mine constitute no less than 65 per cent. of the total freight traffic of the country; they are indispensable to our interstate and international commerce, and are essential to both our present and future welfare and greatness as a nation.

It is believed that the development of a system of co-operation between the State and Federal authorities such as is thus outlined will contribute to the improvement of the service by both the State and Federal Governments; will safeguard the rights of the states; will encourage greater uniformity in mining laws and regulations in the different states; will aid in the conservation of life and resources, and will be generally helpful to mining industries of the country.

### GERMAN AND AMERICAN MINING LOCOMOTIVES.

By Frank C. Perkins.

The development of the mine locomotive has been most satisfactory during the past two decades since the first electric mine haulage system was installed in the Lykens Valley colliery of the Pennsylvania Railroad. It may be stated that electric mine locomotives are now not only extensively employed for the haulage of coal on the branch headings and main entry, but are also utilized to advantage for gathering coal from the working faces of the rooms which was formerly done by mules or horses.

While the compressed air gathering locomotive has been employed in some instances, it is stated that the radius of action is restricted and the efficiency is very

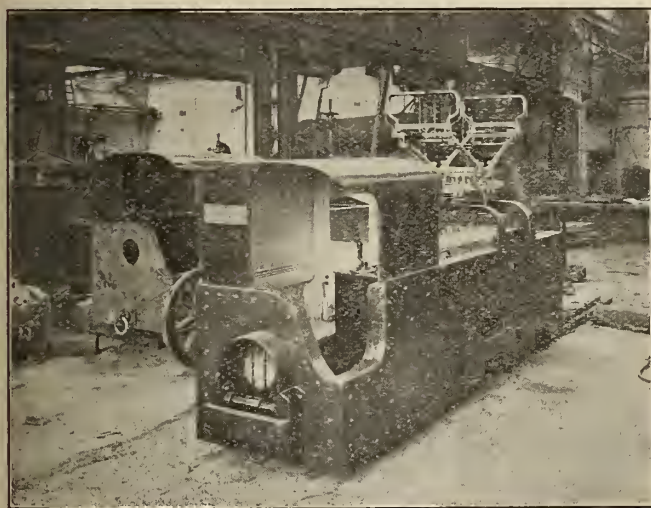


FIG. 1.

low. Where steam power is used for driving the air compressors, it is stated that the effective work done by the compressed air locomotive rarely exceeds 20 per cent. of the original power developed on account of the low plant efficiency. It is held that the efficiency of an electric mine haulage system is much higher, the losses in the engine, generator and locomotive as well as the line seldom exceeding 40 per cent.

The accompanying illustration (Fig. 1) shows the construction and method of operation of the German

mining locomotive as constructed at Berlin at the Siemens Schuckertwerke.

Attention is called to the double-bow-shape collecting device which is so largely used abroad and differs so materially from the American practice as indicated in the accompanying illustrations (Figs. 2 and 3) of the Baldwin-Westinghouse electric locomotives.

The illustration (Fig. 2) shows an American electric locomotive weighing 5 tons and measuring only 7 feet 2 inches in length, 3 feet 4 inches in height and 4 feet 1



FIG. 2.

inch in width. This locomotive is in use at the Bof Eftrellas mines, and was built for operation on a track of a gauge of about 1 foot 8 inches. The drivers are 20 inches in diameter, and the wheel base measures only 2 feet 3 inches. One only is employed on this mine locomotive, which is supplied with a direct current from an overhead trolley, the pressure being 220 volts. The mining locomotive noted in Fig. 3 is used on a gauge of 3 feet 9 inches by the Taylor Coal & Coke Company, and is of much heavier construction. It weighs 26,000 lbs. and measures 12½ feet in length, 4 feet 7½ inches in height and 4 feet 3¾ inches in width. This 13-ton mining locomotive has a wheel base 4 feet 8 inches long, and

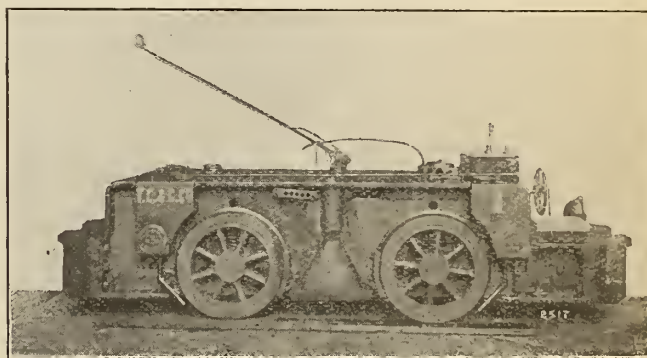


FIG. 3.

driver 30 inches in diameter. There are two railway motors of the direct current type employed, operating from trolley circuits of 220 volts pressure.

As is well known, electric mine haulage is so extensively used that, except for a few instances where special conditions are encountered, no solid arguments can be presented against its use.

The latest power-saving device applied to tube mills is the direct driving of three appliances by means of helically cut gearing. This is expected to save both in first cost and power.



## OUR LONDON LETTER.

### British Coal Mining Statistics.—The Rand and its Problems.—The Copper Situation. The Work of the International Lead Convention.

(Exclusive correspondence to the "Canadian Mining Journal.")

The latest figures with regard to the United Kingdom mining industry are contained in the series of returns showing the preliminary results of the investigation made under the Census of Production Act of 1906. The mines investigated were those which come under the Coal Mines Regulation Act, and include coal, ironstone, iron pyrites, oil shale, fireclay, clay and shale, limestone and sandstone mines. The selling value of their gross output for 12 months was \$616,225,000. The net output was \$531,820,000. The total number of persons employed was 840,280, and thus the net output per person employed was just under \$650 per annum.

The total quantity of coal raised in 1907 was 265,134,000 tons, and the selling value at the pit's mouth \$597,720,000. 24% of the coal raised was exported, and another 7% was shipped for the use of steamers engaged in the foreign trade. Of the steam coal raised 36.9% was exported, and 14.7% shipped for the use of steamers.

The importance of the South African gold industry makes the Rand and its problems always an interesting topic to the English mining engineer, plant manufacturer and investor. Just now it is perceived that the big milling policy inaugurated on the Rand has clearly reduced working costs substantially. With the exception of three mines, figures are to hand showing that the number of tons milled on the Rand for the first nine months of this year amounted to 15,195,798 tons, the yield of gold being very nearly 110,000,000 dollars.

Taking the per ton figures we get the following averages: Total revenue, \$7.20 per ton; the working costs were \$4.25 per ton, leaving a working profit of \$2.95 per ton. This average working profit for the nine months is lower than the working profit for the first quarter, higher than the figure for the third quarter, and identical with the figure of the second quarter. The working costs, however, have been steadily falling when reckoned per ton milled. At the beginning of the year they were 10 cents per ton higher than the average for the nine months.

Of course there are certain critics who contend that the correct method of determining costs is not to take a unit of ore but the quantity of gold recovered—say one ounce or \$5 worth. Either of these quantities is equally good for argument, adherents of the latter holding the opinion that mining policy should tend towards extracting the maximum amount of gold in the minimum of time. From their standpoint costs are not diminishing.

In the first quarter of the year on the Rand the revenue per ton was \$7.40. It cost then \$2.92 to produce \$5 worth of gold. In the third quarter of the year it cost 4 cents more to produce \$5 worth of gold.

Engineers here seem now to have wedded themselves to the idea that every possible ounce of gold should be extracted and consequently low grade ore should be milled, and in order to achieve this object big reduction plants are essential. It is only by the adoption of such means that low grade ore can be pro-

fitably treated. By following out this policy it must necessarily happen that, measured in terms of gold recovered, the ratio of costs will rise.

Talking over one interesting mining innovation on the Rand with mining engineers here, your representative learns that after some years' discussion the separation of the battery plates from the crushing portion of the mill (that is, the stamps and mortars) is being introduced at the Roodepoort United Main Reef's new mill. There will be no tables below the stamps, the crushed mill product being elevated direct from the stamps by a tailings wheel to the tube mills and plate house.

The first company to remove the plates from the battery is the Knight Central. The company's mill started crushing at the beginning of the year. It was erected in six months, and it was not possible to build the separate plate house concurrently. Little extra expense, however, is involved, and it is not thought that the delay in changing over will be more than of a few days. The building will be a large one, 74 feet long, 70 feet wide and 31 feet high up to the eaves. It is estimated that the new scheme of a separate plate house will give about 10 per cent. extra tonnage by saving the time now occupied in dressing and scraping the plates, during which the stamps have to remain idle.

Another advantage will lie in the increased facilities given for obtaining a correct sample of the ore being crushed. This is now obtained from the front of the screens, and the personal equation enters largely. With separate plates, all the crushed product will run down a central launder, in which an automatic sampler will be placed.

The general arrangement of the plate house at the Knight Central will be such that no ore will pass over any of the plates until it has been crushed sufficiently fine to go to the cyanide plant. The present cycle of operations, which is normal, is—(1) Mill plates; (2) Separator; (3) tube mills; (4) shaking tables; (5) return to separator. Under the new scheme the crushed ore will pass from the mortar-boxes to a classifier of the ordinary conical type. The fine crushed ore will pass over the plates. These are to be stationary, as experiments conducted at other mines tend to show that there is little advantage in using shaking tables; from these the ore will pass to the cyanide works. Coarse crushed ore from the separator will now go to the tube mill. There are three of these now installed, which represents one to each forty stamps.

Increased interest is being taken in the outlook for lead, the price of which has not yet responded in any marked degree to the very hopeful outlook for trade generally. Operators in the metal had rather high hopes of the International Convention some months back, but nothing has been done to warrant these hopes yet.

Producers in Germany and Belgium particularly have so far been a source of weakness owing to conflicting interests. The efforts of the Convention to



secure control of the price by reducing the output which it regulated to little more than 20% of the world's total, have been engaged further by labour disputes in Australia.

Readers of the "Canadian Mining Journal" may know that the Convention has not fixed minimum selling prices, but hopes to regulate the price by means of production on a sliding scale. The authorities of the Convention have entered into a provisional agreement which extends up to the end of 1910, after which it will be terminated by giving six months' notice. It embraces Great Britain, Germany, Belgium and France. The output of the combined producers is to be handled exclusively by Henry R. Merton & Company of London and the Metallurgische Gesellschaft of Frankfurt-on-Main.

Furthermore, during recent months the International Conference has been a somewhat persistent seller and early in August the prompt price of lead fell for a moment as low as 61.50 per ton. It has since recovered somewhat. Some consumption has led to accumulation of stocks which, while being less than at this time last year, are much higher than those of a year earlier. It is also believed that there are unknown stocks in Australia and Spain.

Last year's output was over a million tons the largest producer being the United States, which got out more than one-third of this. About half as much came from Spain, less from Germany, and about 90,000 tons from Australia. The United States consumed all but about 30,000 tons of its output and this country came second with a consumption of 228,000 tons. A little way behind came Germany. France consumed less than half as much as we did. The present price of lead cannot be regarded as extravagant. The highest price touched for prompt cash last year was \$74.25, the lowest \$60.25.

The copper situation here shows a stronger sentiment in response to buoyancy of the American share market. A few days ago one of the frequent scares materially depressed the price of standard copper and heavy liquidations took place. The market has, as we say, recovered from the worst, but there are as yet no signs of revival in the demand from the legitimate trade whose attitude has undoubtedly been seriously prejudiced by the bad statistical outlook.

### EXCHANGES.

#### The Quarry, London, Eng., October, 1909.

This number contains an instalment of a treatise on the quarrying and preparation of stone for sale. The article in this issue is devoted to slate quarrying. The authors are Messrs. Allan Greenwell and J. V. Elsdon.

#### The Mining Journal, October 9th, 1909.—

A Department of Mines has been established at the British Home Office. According to **The Mining Journal** which has kept this subject before the public for some years, the new department is inadequate and faulty in organization. "What we look for," says our contemporary, "is a department organized more on the lines of colonial departments of mines, where, although the security of the mines is not neglected—as is evidenced by fatality rates comparing favourably with those in this country—commercial and economic considerations are

given their due place." Continuing, **The Mining Journal** alludes to the insufficient staff of inspectors, to the official neglect of mineral industries other than coal, and to the lack of commercial value in official reports.

#### The Colliery Guardian, October 8th, 1909.—

In a strong editorial the Guardian discusses the attitude of the leaders of the Miners' Federation of Great Britain. The Guardian touches upon the manner in which the officials of the union "despite their fervour of all reforms calculated to promote the safety of the mine, have . . . subordinated such reforms to the financial interest." The Guardian strenuously opposed "working-men" inspectors. The ideal qualification of the proposed "working men" inspectors is to judge from the assertions of one of their chief advocates, "not one that can be suitably tested by any examination; it is simply that the candidate shall not have had an education worthy of the position." On the other hand, "mine-owners and managers. . . desire that those who shall be in a position to dictate to them shall have the necessary technical qualifications irrespective of birth or social standing."

#### The Mining Magazine, October, 1909.

The second number of **The Mining Magazine**, is a worthy successor to the first. A great many subjects are treated. One of the most interesting articles is from the pen of Mr. T. A. Rickard, hydraulic mining is the subject. The operation of an hydraulic elevator is described. On Discovery claim, Ophir Creek, one elevator has been used to work ground since 1898. In addition to the monitor and the elevator a water-lift is employed to pump the seepage in the excavation where this work is proceeding. The installation and working of the elevator are outlined. The cost of operations in this case for 1907 was 45 cents per yard. The use of the monitor and the elevation insures the disintegration of any clay associated with the gold. Decomposed schist is cut and broken with the force of the jet. The hydraulic elevator is extravagant in its use of water. In a country where the precipitation of moisture is small, and where alluvial deposits are widely scattered, it is wasteful to employ water directly to raise water. With water worth \$1 per miner's inch per day, it is possible to use this form of natural energy to better advantage. In many cases it would be more economical to transform the energy of the water into electricity and transfer the power along a copper wire for use in machinery. This idea has already been applied in the Yukon.

The heavy stamp is an assured success, for from a trial run of the new twenty heavy stamps installed on the West Rand Consolidated the individual crushing capacity has been proved to be fifteen tons per day. They were estimated to be able to perform a duty of twelve tons, and it is satisfactory to note that the calculations of the engineers have been more than fulfilled. The importance of this development, not only to the West Rand Consolidated, but to other mines where heavy stamps are being erected, is obvious. It makes, of course, for a further reduction of working costs on the Rand. At the Roodepoort United 100 stamps of 1,910 lb. each are now being erected, and this weight may be even further increased in the case of yet another 100 stamps to be put up on the West Rand Consolidated.



### PYRITE IN THE UNITED STATES.

The production of iron pyrites in the United States in 1908 amounted to 222,598 long tons, valued at \$857,113, an average price per ton of \$3.85. In 1907 the production was 247,387 tons, valued at \$794,949, or \$3.21 per ton. In both years Virginia was the principal producer. The worked deposits in Virginia occur as large lenticular masses conforming to the foliation of the inclosing rocks, mostly crystalline schists of various types. The pyrite is either massive or granular, varying in texture from fine to moderately coarse grained. It is usually associated with varying quantities of quartz and calcite. The general mining practice is to sink shafts in the direction of the dip and to run levels from both sides of the shaft in the direction of the strike. The walls are strong and little trenching is necessary. Imported pyrite still greatly exceeds the domestic supply.

### CANADIAN PATENTS.

The following is a list of Patents issued by the Canadian Patent Office on Oct. 12. relating to Mining and Metallurgizing, and furnished by Fetherstonhaugh & Co., 5 Elgin Street, Ottawa, Russel S. Smart, Resident:

121101. A. S. Dwight, Joliet, Ill., R. L. Lloyd, New York City, processes for roasting and sintering ores.

121103. E. J. Meeker, E. Orange, N.J., F. L. Holmquist, New York City, executors of G. M. Westman,

121105. S. W. Berglund, Stockholm, Sweden, processes for the manufacture of fire-proof stone, of lime and quartz or such like.

121141. J. Hansford, Portland, Eng., mfg. of gas and coke or the like.

121144. H. K. Hess, Philadelphia, Pa., processes and app. for extracting copper from its ores or matte.

121178. C. Rollin, Newcastle-on-Tyne, Eng., mfg. of barium compounds.

121199. R. H. Vidal, Paris, France, processes for obtaining colouring matter from animal fibres.

121200. C. E. Wakefield, London, Eng., treatment of calcium carbide.

### THE RIDDLE READ.

A waiting world hangs on the words of Cook and Peary. Moving silently, but swiftly, the Canadian Mining Journal, with a fine disregard of time, space, and expense, has secured for its own exclusive use, a scientifically exact account of a remarkable dash to the North Pole. The narrative contains a genteel sufficiency of technical terms, and, on the other hand, human interest is not lacking.

The ingenious expedients whereby the larder was replenished eclipse totally the crude penumican and cruder gum-drops of Cook and Peary. The amphibious craft in which the journey was made marks an epoch in locomotion.

But most important are the geographical data observed and recorded. We are proud that it has fallen to our lot to announce the discovery that there is no latitude at the Pole—for untruthful persons.

We commend the whole narrative to the attention of all scientific bodies. It is with unbounded pleasure that we rise to remark that it requires a mining man to do the thing properly.

Our traveller's diaries and official records were sealed in a German silver tube, (a converted sugar-sprinkler), attached to a stone, and ejected from the submerged craft in the water that surrounds the foot of the Pole. There they lie.

### A QUESTION OF LATITUDE.

By A. M. Hay, Toronto.

(All rights and wrongs reserved.)

All successful navigators, have been prevaricators

Since the days of good old Noah and the Ark;  
Columbus told some tales, of sea serpents, whales and gales;

And Raleigh, with the public, had a lark.  
While they sailed the summer seas, navigating at their ease,

With their topsails and their spinnakers unfurled,  
They'd no trouble to keep warm, lots of time to spin the yarn

Which, later on, they reeled off to the world.

The circumnavigator, sticking close to the equator

Made slow progress, by degrees of longitude;  
And, while sailing east or west, he always found it best  
To borrow just a little latitude;

He created quite a rumpus, every time he boxed the compass,

But he ultimately got his work down fine;  
When the compass he could box, he had solved the paradox

That a semi-circle's shorter than a line.

But Arctic navigation evolved a new equation

Full of difficulties no one understood,  
And only those might try, who never told a lie,  
And whose characters from childhood had been good

I longed to be a hero, at eighty below zero,  
To leave the world behind me, and its vice;

Capture walruses and whales, face the howling Arctic gales;

Camp in Igloos, made of virgin snow and ice.

So I chartered for the trip, a combination ship,

One requiring special skill to navigate her;  
She could sail or fly with ease, climb mountains and scale trees—

By lumber-Jacks she's called an alligator.  
I fitted out my craft, rechristened her the Taft,

Then looked about to find a truthful crew;  
Had the luck to find a Bos'n, born and bred upon the ocean,

And a treasure of a Sea Cook, making two.

Though the Bos'n couldn't lie; had but one leg and one eye,

He could damn and curse and swear like a bargee;  
He could furl and reef and steer, and no better Engineer

Or Fireman, e'er was found on land or sea.  
The balance of the crew, could boil and broil and stew,  
And make skilly, out of icebergs at a pinch.

With such a boat and crew, the end I had in view  
Seemed a simple undertaking--was a cinch.

When at last we struck the trail, weighed our anchor  
and set sail

Not a soul was there to cheer as we departed,  
Which perhaps was just as well, there'd be nothing left to tell

Had I told them all my plans before we started.



I've been brought up from my youth, to always tell the truth,  
And to swear all affidavits on a book ;  
So in sunshine and in fog, I entered up the log,  
And had it witnessed by the Bos'n and the Cook.

Our ship had lots of power, good for sixty miles an hour  
Though we started out at seven, in a fog.  
She burned icicles for coal, and as we neared the pole  
She ran up to a hundred, by the log.  
The nearer we got there, the hotter got the air,  
Caused by friction of the alligator's flight ;  
But what could you expect, when you pause to recollect,  
That the blazing sun stayed up with us all night.

On a Friday, just at noon, by the pale light of the moon  
The Bos'n piped his dead eye, and reported  
That the son of a Sea Cook had quietly took his hook  
And that all supplies on board had been deported.  
The news gave me a shock, worse than striking on a rock ;  
The fond hope which until then I had cherished,  
The ambition of my soul, to be first to reach the Pole  
Was in peril of forever being perished.

When I got the information, I made an observation,  
While the Bos'n made a number of his own—  
On the last part of the trip, I would try an Arctic dip  
And travel underneath the iceberg zone.  
So we opened the sea-cock, sank, like going down the lock,  
Went full speed ahead, and then I held my breath,  
For if we slipped a cog, or struck a sunken log,  
It was clearly, just a case of instant death.

I made a calculation, that a little variation  
South of north, would cut the distance just in two  
'Twould be easy to emerge, where lines of longitude converge  
If we steered north—astronomically true.  
We knew we'd reached our goal when we bumped  
against the pole  
Took a half hitch—then we emptied out the tanks.  
As we bobbed up from below, we could hear the breezes blow,  
And on our knees, we offered up our thanks.

On dewatering my eyes, lo ! What was my surprise  
To find the Pole was spinning like a Peary ;  
And there was Cook on top—no I never drink a drop ;  
But I must admit the Bos'n's eye is bleary.  
There are no prevaricators, amongst Arctic navigators ;  
I couldn't tell a lie to save my soul ;  
And I've solved the new equation of Arctic navigation :  
There's no latitude, for liars, at the Pole.

Mr. Boyd Magee, general manager of the Keeley mine, South Lorrain, is in Toronto.

Mr. R. B. Lamb, of the C. L. Constant Company is leaving on a prolonged tour of the Western Mining sections.

Mr. W. H. Trewartha-James, general manager of the Tyee Copper Company, leaves Vancouver shortly to visit London on business. He will return about the first of the New Year.

Captain W. H. Jeffery has resigned his position with the Silver Cliff Mining Company and has left for British Columbia. As manager of Chambers-Ferland, and in his last billet, Captain Jeffery did good work.

The British Broken Hill Proprietary Co., Ltd., has increased its contract for Elmore Vacuum Machines from five units to ten units, the whole plant should thus have a capacity of 400 to 500 tons of zinc tailings per day.

The Way's Pocket Smelter Co., of South Pasadena, Cal., announce that their exhibit has received the highest award in the Mining Building at the Alaska-Yukon-Pacific Exposition in Seattle. This gives Way's Process the highest award of any method of ore testing, as well as showing that it was the best and most attractive exhibit.

October 27, 1909, was an eventful day in the history of the Canadian Mining Institute, for on that day the billiard championship of the Institute was decided. Mr. Eugene Coste and Col. A. M. Hay were the contestants. Preliminaries were arranged by Dr. W. G. Miller. Col. Hay won a brilliant victory. The end is not yet.

A complimentary banquet was tendered to Mr. J. Stevenson Brown, until recently the treasurer of the Canadian Mining Institute, at Montreal, on the evening of Friday, October 22. Major R. G. Leekie occupied the chair, supported by Mr. Charles Fergie. Each mining province, with the exception of Alberta, of the Dominion was represented. Mr. Fergie spoke for Nova Scotia; Major Leekie and Col. A. M. Hay, for Ontario; Mr. H. Mortimer-Lamb for British Columbia; and Mr. John J. Penhale, for Quebec. There were present also Mr. E. E. Ling, of New York, representing the United States members of the Institute, President W. G. Miller, and Councillors R. T. Hopper and H. A. Drury. During the evening a beautiful silver service was presented to Mr. Brown.

The new smokeless fuel of Sherard Cowper-Coles is made by mixing one part by weight of wet peat with two parts of bituminous coal, and heating in a retort five hours at about 850 degrees F. The temperature, aided by the steam from the peat, is just sufficient to drive off the hydro-carbons that produce smoke. The coal binds the peat into a coherent mass, and this fuel has high calorific value, igniting readily in an ordinary grate, and burning economically and without smoke. The tar and other products distilled over in the watery extract may be condensed into a superior pitch, while the gases may be burned to supply the heat required by the process.

#### PERSONAL AND GENERAL.

Mr. Charles Fergie is ill in Montreal.

Mr. J. E. McEvoy is making Toronto his headquarters for the winter.

Mr. C. L. Constant, Jr., of the C. L. Constant Company, is making an extended professional visit to the mining sections of Ontario and Eastern Canada.

## SPECIAL CORRESPONDENCE

## NOVA SCOTIA.

**Glace Bay.—The U.M.W.A. Strike, 19th October, 1909.**—The trend of events in connection with this strike is best shown by figures, and we therefore make no apology for repeating those given in the last letter, with the addition of the average daily outputs for the first half of October.

| Month                | Total Output. | Average<br>Daily Output. |
|----------------------|---------------|--------------------------|
| July .....           | 136,000       | 4,200                    |
| August .....         | 154,000       | 5,900                    |
| September .....      | 180,000       | 7,200                    |
| October, 1-15, ..... | 102,000       | 8,000                    |

We estimated the number of men still out on strike at the end of the third month of the trouble at 1,700 men, and this estimate was confirmed by a parade of U.M.W.A. adherents which was held on the 15th October. This parade was composed of approximately 1,650 persons, and as the men marched in extended order two abreast the procession was of imposing length.

There were several noticeable things about this parade: One was the small stature of the men who marched. The large majority of the processionists possessed the typical physique of the European miner, the characteristics of which are a certain "stockiness" and a marked development of the shoulders and torso in comparison with the lower limbs, and a gait which resembles that of the sailor. This type of physique has been transmitted from generations of miners who have worked in the low seams of Europe, and is not typical of the native Cape Breton miner. The last-named has not more than two or three generations of coal miners behind him, and neither he nor his forbears have ever worked in seams which do not permit of the miner standing upright. There was a sprinkling of the unmistakable Highland strain in the procession, but it was lost in the general impression one obtained of the strikers. One noticed the broad faces of the Huns and Poles, the bristling moustaches of the Belgians, and the dark complexions of the Italians, but as a representative gathering of Nova Scotian miners the parade was a dismal exposure of the true nature of this lamentable strike. We noticed also a number of small boys, several bar-tenders, and men whose working days had long since passed. There is no doubt the procession represented the full strength of the men on the relief roll of the U.M.W.A. at the mines of the Dominion Coal Company. There is a printer just across the way from the office of the Coal Company who believes that Socialism will bring the millenium. This enthusiast, as the head of the procession passed his door, tacked up a red poster, reading: "Vote for Socialism, the only remedy," and took in the poster as the last man went by. It is to be feared the advice was lost on many of those who walked by, not because the advice was un congenial, but because they could not read the English.

The foregoing is not written in any spirit of disparagement other nationalities, but simply to point out that this strike is not centred in Cape Breton and has not arisen out of any local discontent. It is a purely artificial disturbance, brought about by the lavish expenditure of the funds of an American union, and by intimidation of the non-native population, aided by politicians fishing for votes and a small group of disappointed office-seekers who preferred to accept the dole of a foreign union rather than bend their energies to the building up of their own organization. If those who have read in Toronto and Montreal newspapers the statement that "four thousand of the best miners in Nova Scotia" were on strike at Glace Bay, could have viewed this procession, it is to be feared the impression they would carry away would have been unfair to the Nova Scotian miner as he is in reality.

The U.M.W.A. in its abounding wisdom has brought suit against the Dominion Coal Company because, among other enormities, it has "unduly limited the facilities for mining coal." When the Coal Company was incorporated in 1893 the output was 800,000 tons per annum. For the past three years the output has been a little over three and a half million tons annually. The Dominion Coal Company, in the sixteen years of its existence, has added an annual production of coal to the total Canadian output of 2,700,000 tons, or 25 per cent. of the whole production of this Dominion. Notwithstanding the accusations of the U.M.W.A., the Company is proceeding with its policy of limitation, and has three new collieries under construction. The work at Dominion Nos. 12, 14, 15 and 16 Collieries on the Lingan-Victoria areas has been somewhat hindered by the intimidatory tactics of the U.M.W.A., which has endeavoured to prevent the construction men from going to work, and the Company has had to put up with such pleasantries as incendiary fires in the woods around the new mines. Nevertheless, good progress is being made. No. 12 Colliery is complete and ready for producing good outputs. At No. 14 Colliery the permanent bankhead and buildings are well advanced. At No. 15 the work would have been much further ahead but for the violence of the strikers, and it has been found necessary practically to stop operations there and at No. 16 Colliery.

Good progress is being made with the electric transmission line from Dominion No. 2 Colliery to the Lingan collieries. The poles are all erected and braced, and a portion of the wire is strung. The excavations are progressing for the condensing plant at No. 2, and the makers are working on the exhaust-steam turbine, which is to generate the power for the Lingan collieries.

At No. 2 Colliery the addition to the bankhead to house the new screening plant is completed. This screening arrangement will be similar in character to those at the Reserve and No. 6 collieries, and will consist of shaking screens and picking belts.

The activities and doings of the Stock Exchange are far removed from the actual operations of industrial concerns, and the rumours of a merger of steel and coal do not convey much immediate meaning to those who are engaged in the actualities of producing coal and the strike situation. Many of the shareholders in Dominion Coal do not fully realize what a magnificent property that company controls. Its areas are for all practical purposes inexhaustible, and cover the only coalfield in the whole Atlantic seaboard of this continent. The property in course of time will appreciate to an extent hitherto undreamt of. There are few properties in the world with such potentialities as that controlled by the Dominion Coal Company, and it will have to be an exceedingly good deal that gives the shareholders of this company what their property is worth.

## ONTARIO.

**Kenora Mining Division.**—This district comes to the front again with the report of a valuable copper strike within 20 miles of Kenora.

Dr. S. S. Scovil and Frank Moore, the latter an old prospector who was employed in the original opening of the Calumet and Hecla, of Michigan, are now working this claim, which is situated on Alley Island, near Oliver Point, on the Lake of the Woods, within twenty miles of Kenora.

The samples brought to town and shown round contain native copper throughout, and the vein matter seems to be very soft and shale-like in its cleavage. In fact so soft is this vein matter that one would almost be inclined to say it was decomposed



from weathering were it not for the fact that no harder rock is visible even at the tunnel end.

The vein is stripped for 700 feet, and shows a width in one place of 120 feet.

The report of a recent trip through the West Hawk Lake and Star Lake districts gives a good idea both of the main features of the country and its inaccessibility. It says in part:—

“Leaving Ingolf station we paddle to the western outlet of Long Pure Lake, a distance of one mile, then portage to West Hawk Lake across a good dry portage of three-quarters of a mile and paddling down the east side of this lake we come to a point of contact between the granite and the older formations, along which contact is a heavily-mineralized vein on which are located the Mineral Queen and Mineral King mining claims, the latter being owned by Anthony Blume.

“This contact is clearly defined for a distance of eight miles from the lake shore, running S.E. by E., and is again visible on the west side but it changes its direction and swings to the south in a semi-circle, passing within a mile of the Manitoba Shiner on Little High Lake.

“On the western shore of the lake we come to the Bayfield and Caledonia, which show perhaps the most interesting geological formation of any location on the lake.

“On the Bayfield is a bluff 30 feet high, running out into the lake, showing on its exposed face copper and iron pyrites and tourmaline, while the crevices show a curious greyish encrustation not unlike the famous cobalt bloom. Traversing the remainder of the lake to the western extremity, we make a short portage into Star Lake, where the formation changes, showing frequently heavy quartz veins, many of which have been staked and are yielding good gold values.”

**Cobalt.**—Considerable uneasiness was recently felt by many of the mines owing to a coal famine, which seriously threatened them with a shut down. This shortage is due to various causes. The accommodation for freight at the Cobalt railway yards is limited, and the increasing volume of business in the district has brought about a congestion of freight, and the difficulty in securing teams to haul away the freight and coal as soon as placed seems to add to the trouble. Moreover, many of the mines have allowed their coal reserves to become depleted in anticipation of the delivery of the air and electricity before this time. The first mine to benefit by the electric power is the Colonial, where the mill was started up a few days ago. From here the transmission line is being extended to the King Edward, where everything has been in readiness for some time. The present power is being furnished by a temporary generator until such time as the main plant is completed. The importance of the new power to this district cannot be too highly estimated, since the reduction in the cost of power is in itself a considerable item, which will enable many properties now closed down to resume operations. This power will also aid materially in the opening up of the new properties in the Gillies Limit, where such promising finds have been made. The average cost per horse power per year is estimated at about \$175, whereas the new power will be sold for \$50 per horse power per year. The Cobalt Hydraulic Power Co. is pushing its work as rapidly as possible, and expect to have the air ready for distribution by the middle of December. They already have about nine miles of the twenty inch, and five miles of the twelve inch mains connected up. The Mines Power Co. has a force of some thousand men at work, and is making excellent progress. Its two 5,000 ft. compressors will be shipped from England within the next two weeks.

In this connection it might be mentioned that a new and important undertaking of interest to the Cobalt district has recently been financed by Toronto capitalists. This is the erection of a sampler plant, the site for which has been secured from the La

Rose Mines, on the west side of the T. & N.O. tracks, from which a short spur will be constructed. The question of a sampler for Cobalt has long been discussed, and overtures were made to the Ontario government to subsidize this undertaking, but met with no success. The present enterprise is being undertaken by Messrs. Campbell & Deyell, a local firm of engineers entirely on their own responsibility. The capacity of the plant will be one thirty ton car of high grade ore a day. The ore will be ground in a ball mill, and four separate samples taken by automatic riffle samplers, each of these samples being automatically sampled down. A separate plant will also be erected for the sampling of low grade ores, and storage bins of sufficient capacity erected to contain the ore, should it be found necessary to make additions to the ore in order to make same acceptable to the smelter to which it is consigned. This sampler will be of great benefit to many mines, several of which have stated their intention to have their ore sampled. At the present time, with but few exceptions, the only manner in which the silver contents of a shipment are ascertained is by a grab sample, which naturally is anything but accurate. With the facilities for proper sampling, mines desiring to ship low grade ore will be enabled to first determine whether same is of sufficient value to make the shipment a paying one. It is well-known that shipments have left this camp that have not paid for the freight and treatment charges.

Both the mines now using the cyanide process find that the consumption of cyanide amounts to much less than was estimated. Both the O'Brien and the Buffalo are satisfied at the success obtained with this process, which is practically new in this camp. The cyanide consumption at the O'Brien amounts to about 46c. to the ton, while the tailings assay run about 40c. to the ton. This company has decided to eliminate straight concentrating, and cyanide straight from the stamps. Taking into consideration the very complex nature of the cobalt ores it is doubtful if this process can be applied successfully, but the probability is that before long many of the concentrators will be equipped with cyanide plants to treat the slimes.

The district of South Lorrain still continues to attract considerable attention. An important discovery has been made on the property known as R. L. 470, lying about one-third of a mile north of the Kelley, and consists of the same formation as the latter, keewatin and diabase. The vein is in the keewatin formation and has been trenced for about three hundred feet, and in places shows good values in native silver. The Wetlauffer, one of the best known properties in South Lorrain, has 3 in. to 4 in. of high grade ore in the bottom of its shaft at a depth of 110 feet, with the wall rock well mineralized for some distance each side of the vein. It has already shipped one car of high grade ore, and the Keeley has also shipped two cars of medium. Work has been steadily progressing on both these properties all summer, and has proved up a large area. Mining activity in this section will be greatly facilitated in the future as soon as the electric power from the Mines Power Co. is available. The main transmission line of this company, whose plant is at Matabichouan River, which empties into Lake Temiskaming just south of the Montreal River, passes right through this district. Although this district is not as yet served by any direct railway communication, it is an easy matter to team the ore to the shores of Lake Temiskaming and there load on scows and tranship to the C.P.R. at Temiskaming station, at the foot of the lake. The low rates by water offset to some extent the additional expense incurred by re-handling the ore from the boats to the railway.

A large number of claims have been taken up this summer around Fabre, on Lake Temiskaming, in the province of Quebec, just below South Lorrain. This district has been opened up to the prospector owing to the recent changes in the mining laws of Quebec. The size of the claims is 100 acres, and measures one mile long and one sixteenth of a mile wide. One dollar a

acre has to be paid when the claim is staked, and four months are allowed in which to do the work.

The slump in the La Rose and Nipissing stocks, more particularly the La Rose, caused considerable comment in the Cobalt district, since there was no apparent reason for such a sudden drop. One explanation is that Guggenheims are responsible, and that they beat the stock down in an endeavour to get at the lower figure. The most likely explanation is that it is due to market manipulation by some New York interests for the purpose of driving out weekly-held margin accounts. Hitherto La Rose and Nipissing have been very free from market attacks, except in a slight degree.

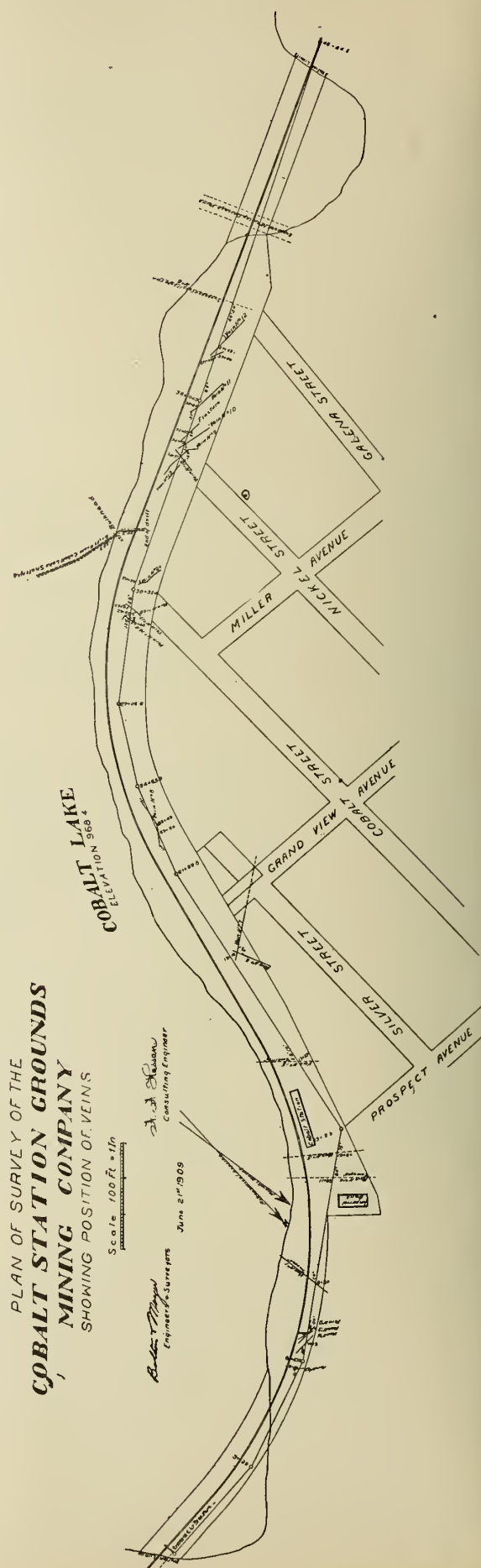
The Crown Reserve Mining Company has leased the Silver Leaf for a period of five years, on a royalty basis of twenty-five per cent. of the gross output of the mine. According to the terms of this lease Crown Reserve must spend twenty thousand dollars in development work on the property during the first year and ten thousand dollars a year for the four succeeding years. A short time ago a shoot of high grade ore was encountered in one of the old workings of the Silver Leaf. A statement has been made by the Crown Reserve that the rumours regarding the draining of Kerr Lake are entirely without foundation, and that this proposition has not been considered. This however, is incorrect, as some time ago the matter was gone into, and a tunnel was proposed, which would drain into Cross Lake.

Members of Parliament from England, Mr. J. A. Baker and Mr. T. Davis, accompanied by Mr. Dignum, visited the camp, and looked over one or two of the properties, prior to making a trip to Gowganda, where they will look over the Reeves-Dobie property, in which they are interested. It is generally understood that the Reeves-Dobie and Blackburn properties each has sufficient ore sacked to make a shipment as soon as satisfactory arrangements can be made for its transportation. The Reeves-Dobie has already made a contract with the Gowganda Transportation Co. to take out their ore at the rate of \$15.00 per ton. It is probable, however, that shipments will not be made until the winter roads are in good shape. Freight rates this season to and from Gowganda should be considerably lower than last year, considering the new and improved roads, and there is every likelihood of increased activity in that section. The Bartlett Mines, of which so much was heard last winter, have sunk to a depth of 100 feet on their main vein, and from that point a crosscut was driven to catch the vein which dipped from the shaft, but failed to find it, and it is believed that the vein pinched out before attaining that depth. Good ore has been opened up on a smaller vein in the No. 2 shaft at the 75-ft. level.

In the Gillies Limit a half interest in the claim known as A.11, which adjoins the Waldman and Young-O'Brien and Silver Bar properties, was purchased by Montreal capitalists. The value of this lot lies in its proximity to the Waldman and Young-O'Brien, on which such good discoveries have recently been made. A gang of men will be put to work at an early date to thoroughly prospect the property by trenching and stripping. The claim has an area of nine acres.

The Union Pacific Mining Co., operating on Peterson Lake, has secured control of the Michigan property adjoining the Farah and Silver Leaf. The price paid is \$240,000, \$140,000 of which is to be paid at once, and the balance within a period of five years. But little work has been done on the Michigan. A shaft has been sunk to a depth of 120 feet, and from this some drifting has also been done.

New gold discoveries are reported from the townships of Whitney and Tisdale, to the north of Gowganda, near Porcupine Lake. Some five hundred prospectors are reported to be on the ground, and many more are going in. All the available ground in Whitney and Tisdale has already been staked up, and pro-





spectors are moving south to the Temagami Forest Reserve. It is announced that the Government will send in an engineer to report on the district. The quartz veins are said to be very rich in places, and generally strike north-east and south-west. The veins are narrow and very similar to those in the Painkiller Lake district, where considerable work has already been done, and the results obtained so far have been very satisfactory. It is said that one claim in the new district has already changed hands for the sum of ten thousand dollars.

The Haileybury Silver Mining Co. has declared a 50 per cent. dividend from the funds obtained from the sale of one of their properties in South Lorrain.

The T. & H. B. has declared another 300 per cent. dividend.

The name of the Young-O'Brien Company has been changed to Wyandoh. It is reported that a fourteen-inch lead of calcite was opened up on A.15, one of the properties of this company, in the Gillies Limit.

In the Le Roi Lake district the Harman-McDougall & Ross syndicate is said to have encountered a new vein, showing high values in silver in places. The vein has been stripped for about 200 feet.

Although the syndicate which purchased the Provincial Mine has only been operating the plant about a week, good results have already been obtained. A good vein has been discovered on the 125-ft. level, and another surface vein has been located near the north end of the property. This syndicate will probably try to get its money back on a stock proposition. The price paid was over \$100,000.

The new vein on the Waldman shows high grade ore at the 65-ft. level. This vein is distinct from the original vein, which dipped from the shaft.

Good ore has been encountered at the 75-ft. level of the Otisse Mine. The wall rock on both sides of the vein is well mineralized.

Cobalt Central.—At the 260-ft. level of this property a new shoot of high grade ore was encountered in a large calcite vein. The capacity of the mill will be increased from 80 to 125 tons per day.

Another high grade vein about 6" wide was struck on the 190-ft. level of the Cobalt Lake Mine. This is about the best discovery yet made on this property.

#### BRITISH COLUMBIA.

**Rossland.**—The Velvet-Portland Mine, owned by the New Velvet-Portland Mining Co., Limited, of London, Eng., has been leased to Mr. Edw. Ehrenberg, of Spokane, Wash., who expects to have a force of about twenty-five men at work within a very short while. This property lies eight miles west of Rossland; is developed to a depth of 400 feet and contains some fairly large bodies of gold-copper ore that will carry from \$20 to \$40 per ton in those metals, with a little silver. It looks as though the opening up of this property foreshadows the resumption of smelting at the Northport smelter, as this is the natural and economical smelting point for Velvet-Portland ore and concentrates. This again would seem to indicate that the Le Roi Mine may be shipping to the Northport smelter at no very late date. There is little doubt but this is the plan of the Le Roi Co.; that is, to ship ore as soon as it seems advisable and resume smelting operations at Northport. There are several Washington mines that would contribute ore to the Northport smelter, in case work was again started up at that point, which would help to make the plant pay, and cut down the cost of smelting as a whole to an economical figure.

Diamond drilling in the Le Roi mine is being prosecuted as rapidly as three machines can drive the holes. Some good ore

that has been uncovered is being stoped and stored, ready for shipment to the smelter.

The work of sinking the Josie shaft on the Le Roi 2, Ltd. is going on steadily, and shipments have come up to the regular figure again, being 490 tons for the week ending Oct. 2nd.

It is stated that at the meeting of the Consolidated Mining & Smelting Co. of Canada, Limited, to be held in Toronto, Oct. 12th, the proposition to increase the capital of the company from \$5,500,000 to \$7,500,000 will be seriously considered. Of course this concern has adopted an extensive policy that not only requires a lot of money but warrants a good capitalization. Since the organization of this company, when over five million dollars was written off the old capital of \$10,266,667, making the new capital \$4,698,800, three years of splendid progress have been accomplished. The plant at the Centre Star group, in Rossland, has been made up-to-date and substantial; a hundred improvements have been made at the Trail smelter and refinery; the Snowshoe mine has been placed upon a producing basis, properties have been acquired adjoining the Snowshoe, in the Slocan, Wellington, and half-a-dozen more good claims have been secured adjoining the Centre Star group. Of course, three years' ore has been extracted from the Centre Star-War Eagle, St. Eugene and other mines of the company, but the extraction has been along sane lines and development work to-day is well advanced and there are large quantities of ore ready for stoping or "in sight." So it appears that there is nothing unreasonable in the consideration of an increase of capital at this time, as it is practically assured that good use will be made of such capital. The Phoenix Amalgamated group is about to be put on a producing basis and other important work outlined. It takes a large amount of capital to mine the semi-low grade ores of Rossland or the low-grade ore of the Boundary, if a company is after legitimate results.

During July and August the gross output of the Consolidated smelter and silver-lead refinery at Trail was \$985,000, as compared with \$635,000 for the same period in 1908. Progress is manifest in these figures to the extent of 55 per cent. for one year. An addition is being made to the lead refinery which will increase its capacity from 70 to 120 tons per day. There are now 240 working tanks in the plant and 180 more are being put in, which, with the settling tanks, etc., will make a total of 596 tanks in the building, which is to be lengthened to 600 feet.

**The Boundary.**—It now appears that we are approaching the climax of the Dominion Copper drama. It is announced that the British Columbia Copper Co., in view of its arrangement with the New Dominion Copper Co. to treat the ore from its mines, is to enlarge its Greenwood smelter, and will build an additional furnace 56 in., by 30 ft., thus augmenting the capacity of the Greenwood plant from 2000 to 3000 tons per diem. The Rawhide mine of the New Dominion Copper Co. will be the first one opened up, and it is thought that October will see the first work begun. This property has probably more ore ready for stoping in its depths than any of the other mines of the Copper Co. It is estimated that the probable reserve in the Rawhide and Idaho mines of the company is between two and three million tons, that should carry \$1 in gold, 18c. in silver and 22 lb. copper per ton. This ought to give a net recovery of 17 lb. copper and \$1.15 in gold and silver per ton, from which it may be calculated that in order for the company to make a profit of 40c. or 50c. per ton at existing prices it will be necessary to keep the mining charges down to about \$1.12 and smelting around \$1.25; converting, refining and marketing 46c. per ton; which, after the deduction of gold and silver will give approximately 10½c. copper.

The output at the Granby mines is being maintained at about 20,000 tons per week. This tonnage, however, will no doubt be increased to 23,000 to 25,000 tons per week when number eight



of the enlarged furnaces is blown in, about Oct. 10th; the full battery of eight furnaces will then be available and at times when none of them are shut down for repairs will be able to treat 28,000 tons per week and over. Working under these conditions would mean a production of 616,000 lbs. blister copper per week, as Granby ore nets approximately 22 lbs. copper per ton and carries \$1 and a little over in gold and silver. Improvements are continually being made about the Granby mines and smelter that with a smaller enterprise would receive considerable comment but which with this concern are passed over, only the big things being noted. At the present writing, new machine shops are being built at Phoenix, new brick thaw-house, an additional installation of electric underground locomotives, etc. About \$250,000 has lately been expended upon mine and smelter improvements, and it is now said that the Granby Co. will be able to produce its blister copper and market it at 8½c. to 9c. per lb. and this on a monthly average. The use of gravity has been worked down so fine that they now use even the cave-in principle. During dry weather and winter a lot of the work is done underground, work in the glory holes not being as favourable as during the summer months, and some of this underground work is done with a view to undermining large bodies of ore. This is comparatively safe as long as it is dry, but being of a lime formation, partly, the action of surface water causes the ground to soften and cave, when it is ready for the steam shovels. A big saving in labour and explosives is thereby effected.

The Oro Denoro mine of the British Columbia Copper Co. is again shipping ore to Greenwood at the rate of 300 tons per week. Twenty-five men are now working at the mine and the shipments will be increased from week to week until a good average is obtained. Large bodies of ore have been placed in Oro Denoro ground by the recent diamond drill operations. The B. C. Copper Co. is also planning to open up the Emma mine in the near future. Shipments from the Mother Lode mine increased 1,000 tons during the past week, and 8,800 tons was sent to the Greenwood smelter. The B. C. Copper Co. will not now begin diamond drill exploration of the several groups of claims recently bonded in Kamloops; this in view of the arrangement to treat New Dominion ore, etc.

An English syndicate has paid \$200,000 for 3,520 acres of coal land on Granite Creek, lately owned by the Tulameen Coal & Coke Co., a concern backed by Vancouver business men. The property is 11 miles from Princeton and will be near the Vancouver, Victoria & Eastern Ry. line, when it is finished.

**Nelson.**—There are two important issues in this district that affect the mining industry and thereby affect the Provincial and Dominion revenue and the revenue of the Canadian, British and foreign capitalists who have their money invested in British Columbia mines. These two issues are lead and zinc. A few years ago the Dominion government recognized that it was most advisable that the lead mining industry of this district should be nourished and the existing bounty on lead was the logical outcome. This measure was a great stimulus to the lead industry, but nature has taken a hand in the matter as work has gone on, and as many former lead mines have with work at depth, become zinc mines, we are now facing a zinc problem. The French capitalists who are working the Blue Bell deposits are doing their mite toward the solution of this problem; the Sullivan group has been acquired by a subsidiary company of the Federal M. & S. Co., of the United States, and as they will have plenty of capital, important work, will no doubt, be done at Marysville; a lot of Nelson capitalists, aided by the Provincial government, to the extent of \$20,000, have expended \$125,000, and five years of work on the electrical zinc smelting furnace. Just as they achieved their object, successful and economical smelting of zinc-lead ore, the money was exhausted, and now for lack of funds this Nelson plant is idle, whereas it should be working daily, and its capacity increased from its present capacity of 10 tons per day to 30, 60, 100, and even 200 tons per day. Overtures are being made to the Dominion government with a view to obtaining a reasonable amount of aid for this industry. There is no doubt that in the years to come the government would be richly repaid for any aid that it may give the zinc industry at this time.

The recently burnt headworks at the Silver King mine have been replaced and shipments will be resumed shortly. It is planned to run a high voltage electric power line from Bonnington into the Sheep Creek district. This will give the mines there power at about \$32 per h.p. per annum.

The last payment of the \$15,000 purchase price on the Van-Roi property will shortly be made. Most of the money has been taken from the mine itself. The gross revenue from operating the mine in August was \$17,582.

Ten thousand acres of Peace River coal lands have been taken up by Canadian capitalists. The deposits are said to be rich, of a good domestic coal, that will also coke to 86%. There are some vast fields of good coal in the Canadian Northwest, from Souris to the Coast and from the boundary line northward, which are bound to be an important factor in the industrial progress of this country, not only in years, but in epochs to come.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Halifax.**—In evidence brought out in the "conspiracy" case brought by the U. M. W. A. against coal operators of the province, it has been proved that there has been no increase in the price of Dominion Coal Company's fuel since 1902. Screened coal sold then, as now, for \$3 per ton; run-of-mine for \$2.75.

**Halifax.**—Unwonted activity in the transfer of gold-mining claims is noticeable. Some Cobalt names, notably that of Mayor H. H. Long, appear in late transactions. Toronto capital, also, has been attracted lately.

### ONTARIO.

**Cobalt.**—The concrete foundations of the Nova Scotia concentrating mill are being employed.

**Elk Lake.**—Thirty men are employed on the claims of the Tee-Arr Mining Co. The shaft has been sunk 65 feet, and native silver is showing up well in the north drift at that level.

No. 1 vein on the north-west claim of the Silver Alliance shows three inches of calcite, with occasional leaf silver. Air is to be supplied from the plant of the Elk Lake Discovery Co.

**South Lorrain.**—The Wettlauffer property is doing well. The



first car of ore yielded a gross amount of 55,000 ounces of silver. The next car is expected to average nearly 4,000 ounces to the ton. At a depth of 103 feet a new vein was struck. At 125 feet another vein is 10 inches wide, and assays more than 4,000 ounces to the ton. Between the two veins is five inches of country rock. The fracture and cleavage faces of the rock are coated with pyrrargyrite.

# BRITISH COLUMBIA.

**Fernie.**—For the week ending October 16th the output of the Crow's Nest collieries was 19,951, a daily average of 3,630 tons (five and one-half days). Of this total, 6,294 went to the coke ovens, the balance being sold to the railways. The daily average was only 136 tons less than the highest ever attained.

**Kaslo.**—The ore shipments over the K. & S. for the month of September totalled 1,855 tons, of which 1,270 were zinc and 585 silver-lead. The principal shippers were the Lucky Jim with 790 tons of zinc ore and the Whitewater with 300 tons of silver-lead and 280 of zinc. The Lucky Jim output was consigned to the United States Zinc Co. at Depue, Ill., and the Whitewater zinc product to the National Zinc Co., Blende, Col., and National Zinc Co., Bartlesville, Okla. The entire silver-lead output went to Trail. The Rambler shows an increased output over that of several months past, with a total of 180 ton of silver-lead, and the Cork is to the fore with 100. A gratifying showing is made with this season's tonnage when comparison is made with that of 1908. A year ago the combined output of all grades of ore amounted to 9,786 tons, this year so far the tonnage is 15,552, a big increase. This is more marked when it is noted that in last year's output is included the monthly shipments from Sandon, which point has been cut off from trans-

portation since last spring. Again, Bluebell's output for two months is not included in the Kaslo-Slocan section, and no mention at all has been made as regards shipments to the Highland-Buckeye at Ainsworth. The C. P. R. is expected to be running into Sandon in about a week, and for some time after connection has been made ore shipments from the Silver City will be heavy. Before 1909 passes into history we believe the combined tonnage of the Kaslo-Slocan district will establish a record untouched since the palmy days. The following are the mines and tonnage for September:—

## Silver-Lead.

|                           | Tons. |
|---------------------------|-------|
| Rambler . . . . .         | 180   |
| Cork . . . . .            | 100   |
| Whitewater . . . . .      | 120   |
| Whitewater Deep . . . . . | 180   |
| Index . . . . .           | 5     |
| Total . . . . .           | 585   |

## Zinc.

|                                 |       |
|---------------------------------|-------|
| Lucky Jim . . . . .             | 790   |
| Whitewater Deep . . . . .       | 330   |
| Whitewater . . . . .            | 150   |
| Total . . . . .                 | 1,270 |
| Total tonnage for month, 1,855. |       |

Total output of silver-lead and zinc ores of the district for the year to date, 15,552 tons. Added to this total are the shipments for September and August from the Bluebell. These are respectively 360 and 395 tons, bringing the grand total up to 16,207 tons.

# MINING NEWS OF THE WORLD.

## GREAT BRITAIN.

A general stoppage of work in all the iron ore mines of West Cumberland is threatened. The men demand increase of wages and complete recognition of their union. Their wages are now 17s less per fortnight than they were in 1907. It is claimed that trade is better and that wages should rise.

## AUSTRALIA.

The strike of the employees of the Broken Hill Proprietary Company, which was called on January 1st, 1909, cost the men £265,000 in wages, the company £33,600, and the transportation companies £160,000. Added to these losses are the losses of the New South Wales coal miners, part of whose regular market was cut off.

## EGYPT.

An important discovery of petroleum has been made at Jebel Tanka, on the Gulf of Suez. The oil springs are on the shore immediately in front of a high perpendicular cliff. The springs are covered by the sea at high tide. The fact that the oil is being forced up through tight joints in the rock is taken to indicate that great oil pressure exists below. An available supply of petroleum here will prove of immense importance to the British Navy.

## SOUTH AFRICA.

During July 1909, there were 9,620 stamps at work on the Rand. The corresponding number for July, 1908, was 8,975. Dividend declared during the first six months of 1909 amounted to £4,798,696.

## SOUTH AFRICA.

The West Rand Consolidated's twenty new heavy stamps have had a trial run and accomplished the satisfactory result of 15 tons per stamp per day with 100 mesh screening. The stamps are of 1,850 lbs. weight, and have a base of greater diameter and a larger mortar box than usual on the Rand.

The profits of the Summer and Jack during the past year were £716,000. All ore carrying more than 3 dwts. is regarded as payable, owing to the low operating and milling costs. The ore reserves are estimated at 2,500,000 tons, averaging more than 61½ dwts.

## RUSSIA.

**St. Petersburg.**—The director of the Baku-Black Sea Company telegraphs to the St. Petersburg Press confirming the news of the spouting of a great gusher on their property at Maikop, near the Black Sea coast. On 12th September it began, and took fire three days later. After tremendous efforts the fire was extinguished on the fourteenth day after spouting. It is estim-

ated by the district engineer Markovsky that it has already thrown out 2,000,000 poods (32,250 tons) of naphtha. Though plugged, it burst through again on the sixteenth day, and is delivering about 40,000 poods a day. This is an event of great importance as showing plentiful reserves of oil within easy shipping reach of foreign ports. The district has long been the scene of careful boring.

The following figures, showing the output of copper in Russia and the outlook for an increased production in the future, are furnished by the American Consul at Moscow in a recent report. The output amounted to 10,306 tons, 14,554 tons and 16,591 tons in 1906, 1907 and 1908 respectively, showing a steady increase. Deposits of copper in the Caucasus are said to present vast opportunities, and enormous beds of coprolites exist in Central Russia and in the Dniester basin, the quantities in the latter alone being estimated as high as 27,000,000 tons.

The production in the several districts in 1908 were as follows, in tons: Ural, 8,429; Caucasus, 4,780; Siberia and Kirghis, 2,516; all other districts, 966. The consumption of copper in

Russia in 1908 was as follows: Produced in the Empire, 16,478 tons; imported, 4,855 tons; total, 21,333 tons, less 113 tons exported. The prices in Moscow during 1908 ranged from 27s to 34s per pood of 36 lbs.

#### MEXICO.

The total percentage of recovery of the metal contents of the ore at the plant of the El Oro Mining and Railway Company is 89.41 per cent. The total working expenses are \$5.42 per ton. Apart from development, etc., the actual mining and milling costs average \$4.22 per ton.

Four months ago the Federal regulation providing for drawback of duties on mining and metallurgical machinery expired. Refunds can now be secured only by personal application to the Department of Fomento. Such applications must be accompanied by complete data descriptive of the plant at which the importer intends to use the machinery. This tends to prevent any but the largest concerns from availing themselves of the drawback.

## COMPANY NOTES.

### LA ROSE CONSOLIDATED MINES COMPANY LIMITED.

Apart from certain features, to be noted in a forthcoming issue, the second annual report of La Rose Consolidated Mines Company, Ltd., is a satisfactory document.

In his summary, Mr. R. B. Watson states that approximately 3,000,000 ounces of silver have been produced at a total cost of 16 cents per ounce. At a selling price of 51 cents, the net profit per ounce is 35 cents. The net profit, including receipts from sales of cobalt and arsenic, amounted to \$1,090,040 for the fiscal year ended May 31, 1909. For comparison it may here be mentioned that the net profits distributed among owners of La Rose mine from July, 1904, to May 31, 1908 (vide Report, June 20, 1908), totalled \$1,006,040.82.

The earnings for the fiscal year came entirely from La Rose mine, which also financed the equipment and development of the outside properties. The Lawson was acquired in April, 1909, and thus little work could be accomplished before the end of the fiscal year.

Mr. Watson mentions that, as might be expected, considerable sinking and development is necessary before the Lawson can produce steadily. No stopping has been done on the Princess. Apparently the only encouraging symptom here is the cutting on the 135-foot level of the vein originally found on the 50-foot level.

**Production.**—The production of the La Rose properties for the year is shown in this table:—

|                  | Tons.      | Ozs. silver. | Net value.     |
|------------------|------------|--------------|----------------|
| La Rose .....    | 6,141.8475 | 279,953.97   | \$1,346,161.63 |
| Princess .....   | 7.6345     | 19,331.71    | 9,167.25       |
| University ..... | 24.3790    | 6,077.56     | 5,710.87       |
|                  | 6,173.8610 | 3,005,383.24 | \$1,363,039.75 |

Shipments for the year ending May 31, 1909:—

|                                                            |                |
|------------------------------------------------------------|----------------|
| Dry tons shipped .....                                     | 6,063.6705     |
| Gross ounces silver contained .....                        | 2,915,706.58   |
| Gross silver value .....                                   | \$1,492,046.70 |
| Average price received per oz. cents .....                 | 51.173         |
| Received from sales of Cobalt .....                        | \$ 24,059.52   |
| Received from sales of Arsenic .....                       | 322.15         |
| Gross silver values plus Cobalt and Arsenic paid for ..... | \$1,516,428.37 |
| Smelter deduction, freight and treatment \$ .....          | 196,280.45     |
| Net value received from ore sales .....                    | \$1,320,147.92 |

### TYEE COPPER COMPANY.

The tenth ordinary general meeting of the Tyee Copper Co., Ltd., was held on September 30, at Cannon Street Hotel, London, E.C. Mr. T. H. Wilson acted as chairman.

The chairman announced that the Board of Directors had considered it inexpedient to issue a detailed balance sheet. Following the practice of all other smelting companies a condensed balance sheet had been prepared. No dividend was to be declared for the past year, as a loss of £22,646, 4s, 1d, has been incurred. This amount was made up principally by the items of £5,066, 9s, for depreciation on properties; £3,097, 18s, 1d on plant and buildings; £6,666, 15s, 5d loss on outside mining operations; and £3,034, 9s, 7d in inspecting various properties. Depreciation was allowed for at the regular rate of 10 per cent.

The smelting of customs ore, it was stated, is increasing steadily, the year ending with the last of August, 1909, was the best since 1905. The copper produced amounted to 3,245,424 lb. The second furnace is now completed and working satisfactorily. The two furnaces combined are capable of treating over 12,000 tons of ore per month, working only 25 days. This equipment is placed on the balance sheet at the low valuation of £28,712, 14s, 2d. During the past year one furnace only was in use for seven months.

The report and accounts were accepted after a warm debate. Several shareholders insisted that a detailed balance sheet should be given. It was explained by the chairman that since the company is now a customs smelting concern it would be decidedly bad business to divulge particulars of operations. The vote stood 19 for and 12 against.

The Kerr Lake dividends are payable December 15. The new rate of quarterly dividends is equal to 35 per cent. per annum. At a meeting of directors held on Oct. 15, Julius A. Lewisohn was elected a director of the company.

Tyee Copper results for the month of September, 1909, are as follows:—Smelter ran 16 days, treating 4,000 tons of ore, producing a total of 416 tons of matte.

### LAKE SUPERIOR CORPORATION.

The report of the Lake Superior Corporation for the year ended June, 1909, states that the income derived from the subsidiary companies was £501,424, while interest and miscellaneous receipts amounted to \$65,087, totalling \$566,511. Interest and



general expenses, including interest on First Mortgage and Collateral Trust bonds, absorbed \$543,516, leaving a surplus of \$22,995. The result of the year's operations of all the subsidiary companies of the corporation, complied without provision having been made for bad and doubtful debts, depreciation and renewals, shows a surplus for the year of \$1,093,372. Of this amount, \$501,424 has been paid to the Lake Superior Corporation in interest and dividends. The remainder of the surplus has been set aside by the subsidiary companies, as in previous years, to-

wards providing for such depreciation, etc. In view of this, the directors have not felt able to pay interest on the income bonds for the year. They are confident, however, that their decision will be approved by the income bondholders. When the reorganization of the corporation was consummated in 1904, an amount was provided for working capital, which proved quite insufficient for the needs of the various companies. The result was that the companies were forced to borrow heavily from the banks.

## STATISTICS AND RETURNS.

### COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt Camp for the week ending Oct. 16, and those from Jan. 1, 1909, to date:

|                                                                               | Oct. 16.    | Since Jan. 1. |
|-------------------------------------------------------------------------------|-------------|---------------|
|                                                                               | Ore in lbs. | Ore in lbs.   |
| Cobalt Central .....                                                          | 44,442      | 685,196       |
| Crown Reserve .....                                                           | 115,420     | 4,923,894     |
| La Rose .....                                                                 | 381,434     | 10,397,882    |
| McKinley Dar. ....                                                            | 89,706      | 1,643,424     |
| Nipissing .....                                                               | 129,402     | 10,317,618    |
| O'Brien .....                                                                 | 64,042      | 2,215,649     |
| Silver Queen .....                                                            | 86,449      | 684,844       |
| Silver Cliff .....                                                            | 58,000      | 241,820       |
| Trethewey .....                                                               | 65,000      | 1,678,698     |
| Ore shipments to Oct. 16, from Jan. 1, are 46,315,563 pounds, or 23,157 tons. |             |               |
| Total shipments for week ending Oct. 16 are 947,446 pounds, of 473 tons.      |             |               |

### COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt Camp for the week ending Oct. 23, and those from Jan. 1, 1909, to date:

|                      | Oct. 23.    | Since Jan. 1. |
|----------------------|-------------|---------------|
|                      | Ore in lbs. | Ore in lbs.   |
| Buffalo .....        | 56,200      | 945,978       |
| Carnegie .....       |             | 63,410        |
| Chambers-Ferland ..  |             | 961,010       |
| City of Cobalt ..... |             | 1,100,122     |
| Central Cobalt ..... |             | 685,190       |
| Cobalt Lake .....    |             | 141,340       |
| Coniagas .....       | 60,900      | 1,356,515     |
| Crown Reserve .....  | 124,790     | 5,048,684     |
| Drummond .....       |             | 992,100       |
| Kerr Lake .....      | 120,215     | 1,886,341     |
| King Edward .....    |             | 183,740       |
| La Rose .....        | 513,701     | 10,911,583    |
| McKinley-Dar. ....   |             | 1,643,424     |
| Nipissing .....      | 191,800     | 10,509,418    |
| Nova Scotia .....    |             | 480,810       |
| Nancy Helen .....    |             | 124,700       |
| Peterson Lake .....  |             | 324,040       |
| O'Brien .....        | 128,100     | 2,343,749     |
| Right of Way .....   | 124,191     | 2,533,226     |
| Silver Queen .....   |             | 684,844       |
| Silver Cliff .....   |             | 241,820       |
| Stewart, H. J. ....  |             | 62,392        |
| Temiskaming .....    |             | 1,626,060     |
| Trethewey .....      |             | 1,678,698     |
| T. & H. B. ....      |             | 1,106,260     |

Ore shipments to Oct. 23, from Jan. 1, are 47,635,450 pounds, or 23,817 tons.

Total shipments for week ending Oct. 23 are 1,319,897 pounds, or 659 tons.

**La Rose Reserves.**—La Rose reserves as at June 1, 1909, were as follows:—

| Partly Developed:— | Gross Value |                 |              |                  |
|--------------------|-------------|-----------------|--------------|------------------|
|                    | Tons.       | Ounces. Silver. | 51c. per oz. | Estimated Profit |
| Main vein .....    | 3,189.4     | 2,668,088       | \$1,424,513  | \$2,987,329.96   |
| No. 3 vein .....   | 278.6       | 790,605         | 408,781      | 283,326.11       |
| McDonald vein .... | 926.7       | 748,621         | 400,331      | 277,469.42       |
| No. 10 vein .....  | 188.6       | 100,391         | 54,971       | 38,100.40        |
|                    | 4583.3      | 4,307,705       | \$2,288,596  | \$1,586,225.89   |
| Country rock:      |             |                 |              |                  |
| McDonald ... ..    | 5747.       | 454,013         | 231,546      | 142,812.95       |
|                    | 10,330.3    | 4,761,718       | \$2,520,142  | \$1,729,038.84   |
| Indicated ore:     |             |                 |              |                  |
| No. 3 vein ... ..  | 68.9        | 206,700         | 106,795      | 74,019.61        |
|                    | 10399.2     | 4,968,418       | \$2,626,937  | \$1,803,058.45   |

Following are the September returns of Le Roi No. 2:—  
“Josie mine report for last month—Shipped 2,490 tons. The receipts from smelter are \$73,262 (£15,105), being payment for 2,859 tons shipped, and \$3,012 (£621), being payment for 80 tons concentrates shipped. In all, \$76,274 (£15,726).

### B.C. ORE SHIPMENTS.

Nelson, October 9.—The following are the ore shipments and smelter receipts from Southeastern British Columbia for the past week and the year to date:

| Boundary—         | Week.  | Year.     |
|-------------------|--------|-----------|
| Granby .....      | 18,013 | 756,906   |
| Snowshoe .....    | 4,166  | 112,728   |
| Mother Lode ..... | 9,366  | 210,546   |
| Oro Denoro .....  | 1,100  | 3,038     |
| Other mines ..... |        | 664       |
| Total .....       | 32,745 | 1,083,927 |
| Rossland—         | Week.  | Year.     |
| Centre Star ..... | 3,295  | 135,529   |
| Le Roi Two .....  | 476    | 24,167    |
| Do. milled .....  | 260    | 10,240    |
| Other mines ..... |        | 9,561     |
| Total .....       | 4,031  | 179,497   |

| Slocan-Kootenay—         | Week. | Year.  |
|--------------------------|-------|--------|
| Queen, milled .....      | 420   | 16,596 |
| G. Poorman, milled ..... | 250   | 9,850  |
| W. Deep, milled .....    | 700   | 27,800 |
| K. Bell, milled .....    | 70    | 2,770  |
| S. Relief, milled .....  | 145   | 5,730  |
| Nugget, milled .....     | 110   | 4,350  |
| Blue Bell, milled .....  | 900   | 35,600 |
| St. Eugene .....         | 278   | 16,445 |
| Aurora .....             | 12    | 12     |
| North Star .....         | 249   | 1,945  |
| Second Relief .....      | 31    | 32     |
| Blue Bell .....          | 142   | 3,891  |
| Granite-Poorman .....    | 30    | 355    |
| Van Roi .....            | 82    | 698    |
| Highland Buckeye .....   | 70    | 134    |
| Whitewater Deep .....    | 65    | 2,843  |
| Rambler-Cariboo .....    | 21    | 824    |
| Emerald .....            | 32    | 961    |
| Other mines .....        | ...   | 15,628 |

|                   |        |           |
|-------------------|--------|-----------|
| Grand total ..... | 40,583 | 1,410,182 |
| Total .....       | 3,807  | 146,758   |

**SMEALTER RECEIPTS.**

|                       |        |           |
|-----------------------|--------|-----------|
| Granby .....          | 18,013 | 757,356   |
| Consolidated Co. .... | 9,149  | 314,319   |
| B. C. Copper .....    | 10,566 | 213,629   |
| Le Roi .....          | ...    | 12,761    |
| Total .....           | 37,728 | 1,298,065 |

Nelson, October 16th:—The refinery of the Consolidated Co. at Trail, which has been enlarged, will shortly be ready to treat 150 tons a day. The ore shipments and smelter receipts for the past week are the highest so far this year. Appended are details of both:

| Boundary—         | Week.  | Year.     |
|-------------------|--------|-----------|
| Granby .....      | 22,371 | 779,277   |
| Snowshoe .....    | 3,529  | 116,257   |
| Mother Lode ..... | 11,132 | 221,678   |
| Oro Denoro .....  | 3,300  | 3,383     |
| Other mines ..... | ...    | 664       |
| Total .....       | 37,332 | 1,171,259 |

| Rossland—         | Week. | Year.   |
|-------------------|-------|---------|
| Centre Star ..... | 3,233 | 138,762 |
| Le Roi 2 .....    | 570   | 24,737  |
| Do. milled .....  | 260   | 10,500  |
| Other mines ..... | ...   | 9,561   |
| Total .....       | 4,063 | 183,560 |

| Slocan-Kootenay—         | Week. | Year.  |
|--------------------------|-------|--------|
| Queen, milled .....      | 420   | 17,010 |
| G. Poorman, milled ..... | 250   | 10,100 |
| W. Deep, milled .....    | 700   | 28,500 |
| K. Bell, milled .....    | 70    | 2,680  |
| S. Relief, milled .....  | 145   | 5,875  |
| Nugget, milled .....     | 110   | 4,830  |
| Blue Bell, milled .....  | 900   | 3,986  |
| St. Eugene .....         | 508   | 16,963 |
| Blue Bell .....          | 95    | 3,986  |
| Yankee Girl .....        | 81    | 2,096  |
| Panama .....             | 69    | 69     |
| Whitewater Deep .....    | 37    | 2,880  |

|                    |        |           |
|--------------------|--------|-----------|
| Silver Cup .....   | 34     | 1,124     |
| Eastmunt .....     | 39     | 92        |
| Emerald .....      | 28     | 982       |
| Standard .....     | 22     | 407       |
| Ottawa .....       | 28     | 427       |
| Molly Hughes ..... | 21     | 251       |
| Empress .....      | 2      | 2         |
| Other mines .....  | ...    | 15,746    |
| Total .....        | 3,639  | 150,317   |
| Grand total .....  | 44,954 | 1,455,136 |

**SMEALTER RECEIPTS.**

|                    |        |           |
|--------------------|--------|-----------|
| Granby .....       | 22,371 | 779,727   |
| Consolidated ..... | 8,296  | 322,615   |
| B. C. Copper ..... | 11,432 | 225,061   |
| Le Roi .....       | ...    | 12,761    |
| Total .....        | 42,099 | 1,340,164 |

**TORONTO MARKETS.****Metals.**

Oct. 26.—(Quotations from Canada Metal Co., Toronto.)  
 Spelter, 6½ cents per lb. (strong).  
 Lead, 3.75 cents per lb.  
 Antimony, 8½ to 9½ cents per lb.  
 Tin, 32 cents per lb.  
 Copper, casting, 13.65 cents per lb.  
 Electrolytic, 13.75 cents per lb.  
 Ingot brass, 9 to 12 cents per lb. (metal market very steady).  
 Oct. 26.—Pig Iron (quotations from Drummond McCall Co.)  
 Summerlee, No. 1, \$24.00 (f.o.b. Toronto).  
 Summerlee, No. 2, \$23.50 (f.o.b. Toronto).  
 Midland, No. 1, \$22.50 (f.o.b. Toronto).  
 Coal, anthracite, \$5.50 to \$6.75  
 Bituminous, \$3.50 to \$4.50 for 1¼ lump.

**Coke.**

Oct. 22.—Connellsville coke (f.o.b. ovens).  
 Furnace coke, prompt, \$2.75 to \$2.85 per ton.  
 Foundry coke, prompt, \$2.60 to \$2.85 per ton.  
 Oct. 22.—Tin (Straits), 30.45 cents.  
 Copper, prime Lake, 12.90 to 13.00 cents.  
 Electrolytic copper, 12.70 to 12.75 cents.  
 Copper wire, 14.50 cents.  
 Lead, 4.40 cents.  
 Spelter, 6.40 cents.  
 Sheet zinc, 8.50 cents.  
 Antimony, Cookson's, 8.37½ cents.  
 Aluminum, 23 to 24.00 cents.  
 Nickel, 40.00 to 49.00 cents.  
 Platinum, \$28.50 to \$32.25 per oz.  
 Bismuth, \$1.75 per lb.  
 Quicksilver, \$46.00 per 75-lb. flask.

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|-----------------|---------------------|-------------------|
| October 9 ..... | 51¼                 | 23 11-16          |
| " 11 .....      | 51¼                 | 23 11-16          |
| " 12 .....      | 51¼                 | 23 11-16          |
| " 13 .....      | 51                  | 23 9-16           |
| " 14 .....      | 51                  | 23 9-16           |
| " 15 .....      | 50¾                 | 23 7-16           |
| " 16 .....      | 50¾                 | 23 7-16           |
| " 18 .....      | 50¾                 | 23 1-2            |
| " 19 .....      | 51                  | 23 9-16           |
| " 20 .....      | 51                  | 23 1-2            |
| " 21 .....      | 51                  | 23 1-2            |
| " 22 .....      | 50¾                 | 23 3-8            |



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Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The allied metal, cobalt, is also found in Ontario in unsurpassed quantities.

The output of iron, copper, nickel, silver and cobalt in 1906 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

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Minister of Lands, Forests and Mines,  
**Toronto, Canada.**

# PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are : Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc ; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows :

All mines belong to the Government of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unsurveyed territory, is open to prospecting.

**Miners' Certificates** good for a calendar year may be obtained by sending \$10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minimum being 40 acres in unsurveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of \$10.00 plus a yearly rental of \$1.00 per annum. No inspection of the discovery or assessment work is required.

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territory may be purchased as a mining concession at the price of \$20.00 per acre if within 20 miles of a railway in a straight line, or \$10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

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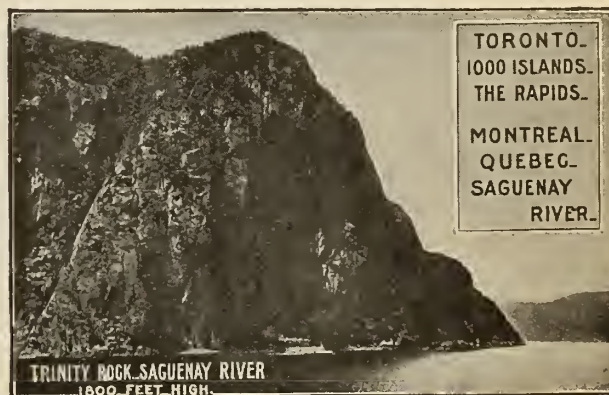
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The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was \$5,579,039 the Lead Output 52,408,217 lb., and the Copper 42,990,488 lb.

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Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

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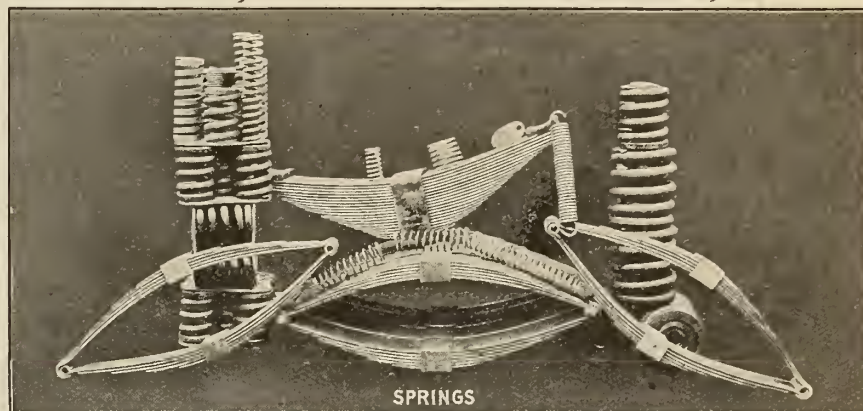
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Westinghouse Mine Motors are noted for great strength of parts, large self-oiling bearings that seldom need attention, large overload capacity, low operating temperature and high efficiency.

We illustrate a Westinghouse Induction Motor driving a Deep Mine Sinking Pump. Westinghouse Alternating and Direct Current Motors are fully described in Circulars 1068 and 1118; ask for copies.



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It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

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Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

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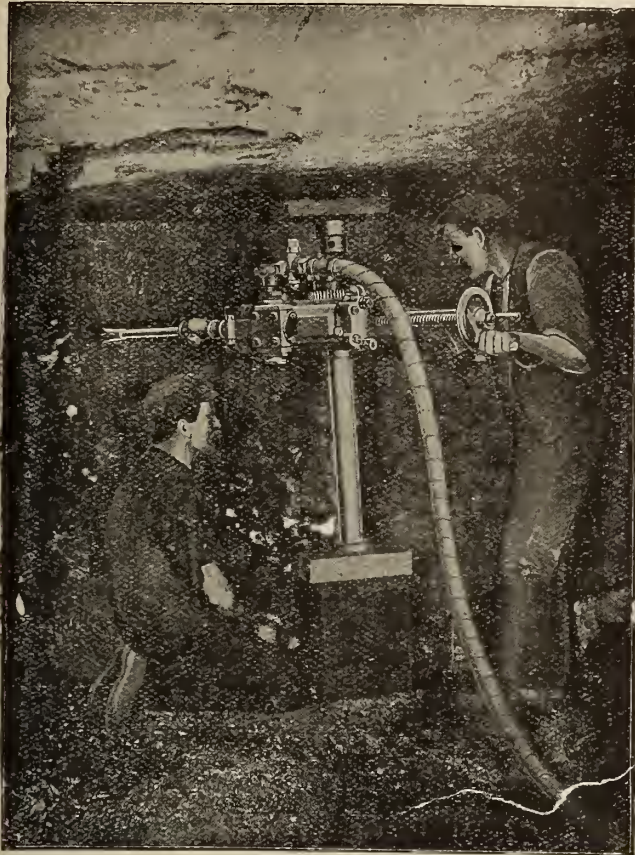
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Three Post Magneto Electric Blasting Machine

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Holes at Floor Level or Roof Level or in any intermediate position in Coal or Dirt Band, &c.

Equally suitable for Holing and Shearing.

The Lightest Coal Cutter in the Market.

Nearly 700 Machines at work. 93 in use by one Canadian Company.

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Weight 22 lbs. Bores 6 ft. Deep.

Automatically Rotates the Drill Steel and lows out the Cuttings  
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### SOLE MAKERS

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Stocks of these machines kept by Messrs. A. C. Thompson  
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We would like to have a personal talk and make a demonstration to every superintendent and foreman in Canada, for we know we could convince them of the superiority of "Cleveland" Stope Drills. A talk is out of the question but we can make a demonstration if you will give us the chance by sending you one for trial

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After it has been in operation 30 days you can send it back if it isn't entirely satisfactory.

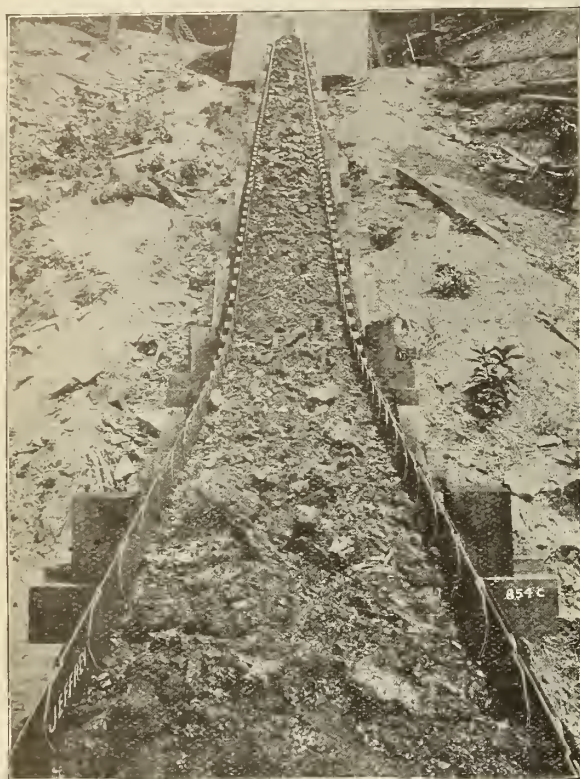
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**CANADIAN CLEVELAND DRILL CO.**  
LIMITED

P.O. Box 522, Cobalt, Ontario

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are the best means of delivering coal from upper to lower tipple without breakage. We have Conveyers of this type in operation handling from 50 to 500 tons, distances as great as 1150 ft.

Descriptive Catalogue X25

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Greater Drilling Speed  
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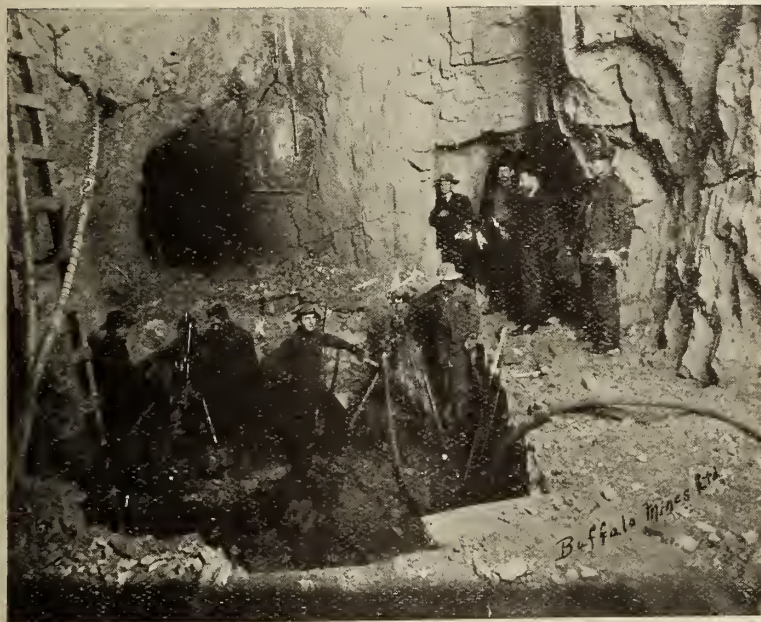
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☑ Our claim that the Rand drill is the best in the market is proven by the sale of more of this type than of all other makes combined.

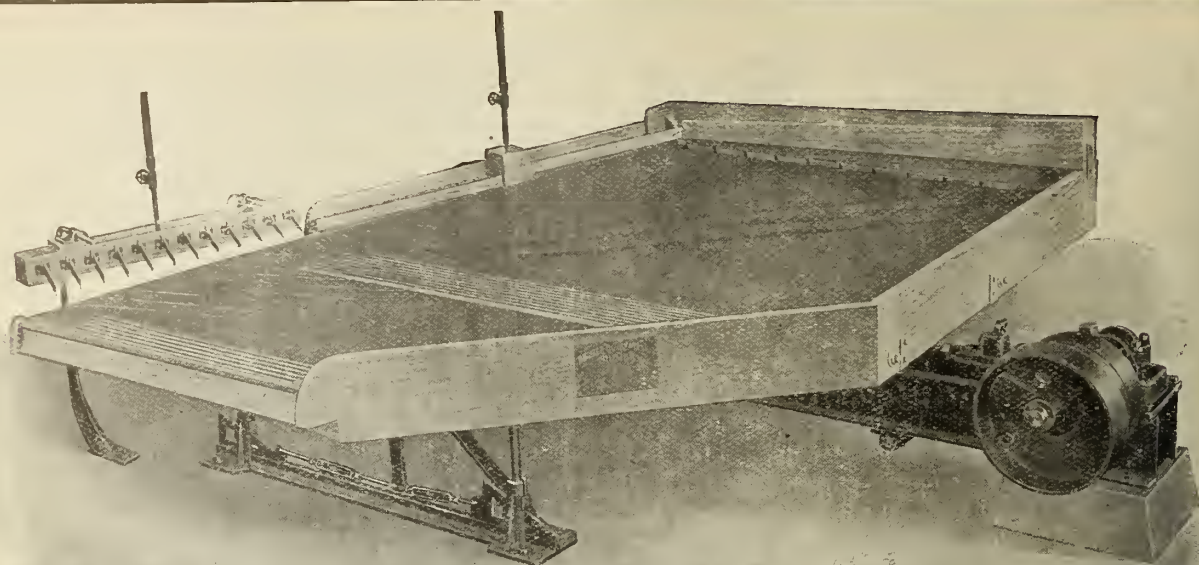
☑ Prices and catalog on request, or ask to have one of our representatives call.

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Is another step forward in the concentration of slimes. Embodying the same general principles as our No. 3 table the improved mechanical construction has enabled us, in actual mill operation, to make a greater saving with less attention and repairs.

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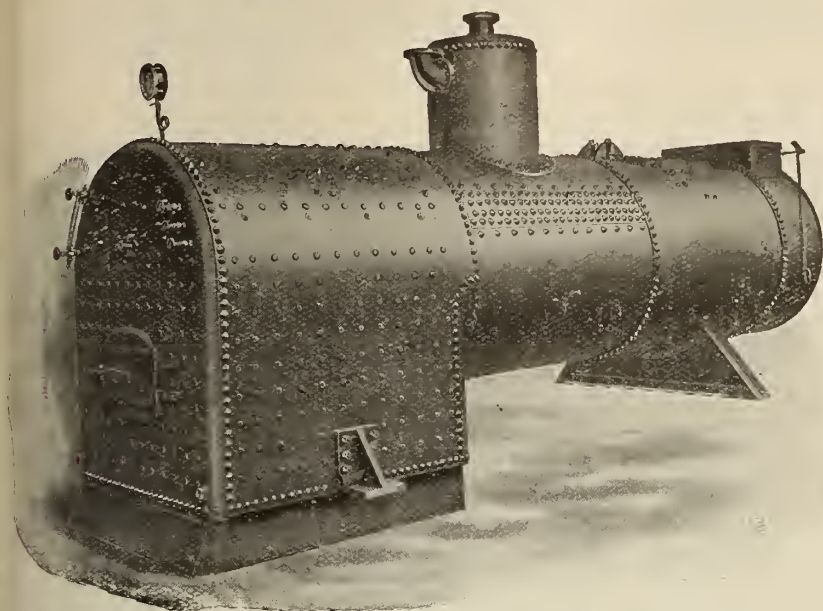
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Write for prices for  
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For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. **SPECIALLY FLEXIBLE ROPES** for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. **SPECIAL ROPE FOR LOGGING.**

Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz:

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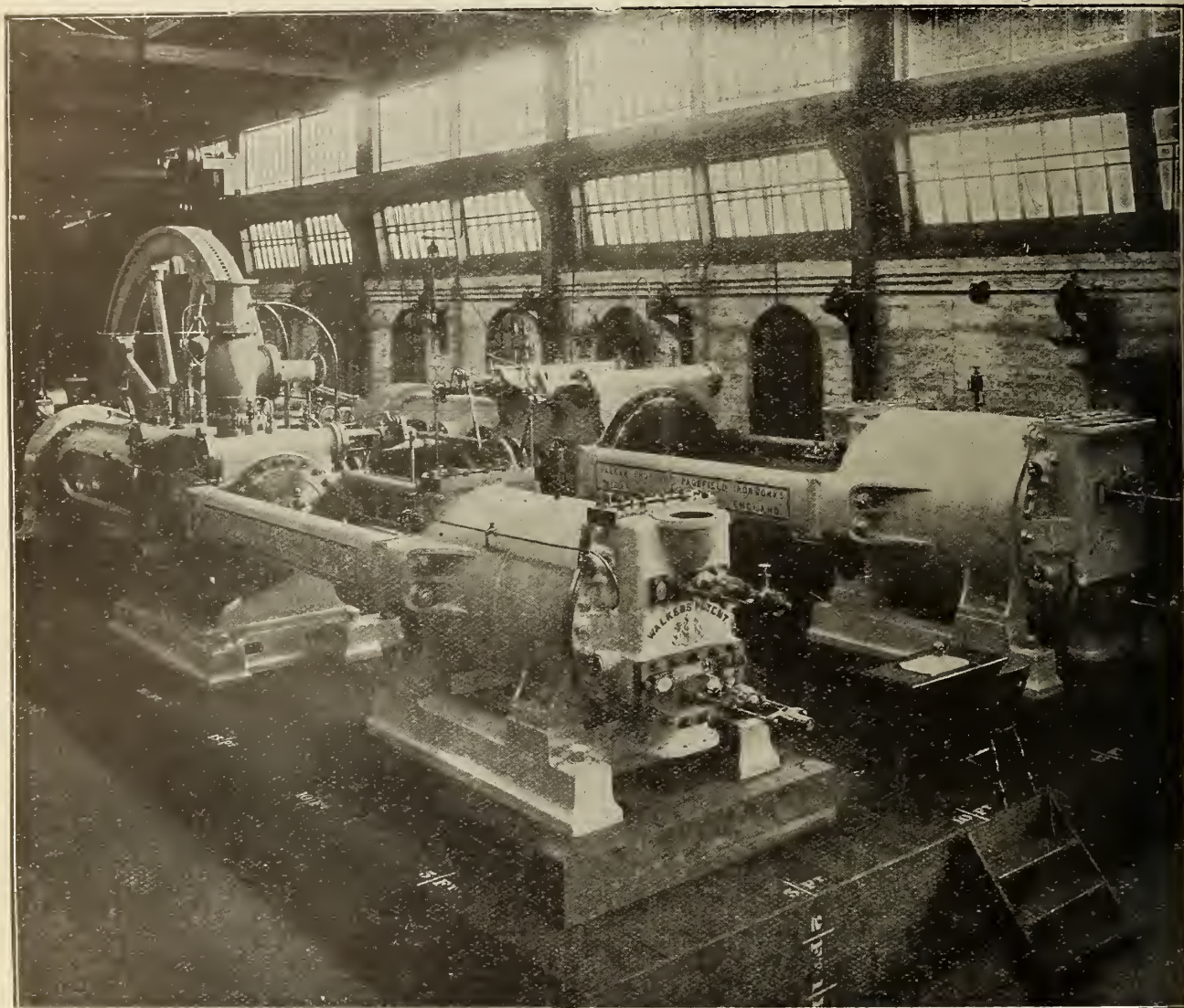
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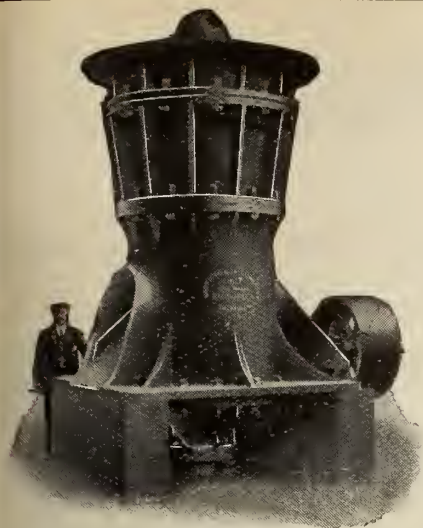
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is used for all the wearing parts. This steel is the supreme material for  
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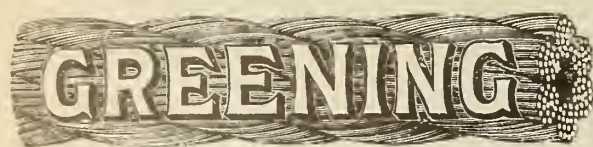
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We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., \$400 to \$10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

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Manufactured By

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**CANADIAN BRONZE POWDER WORKS**

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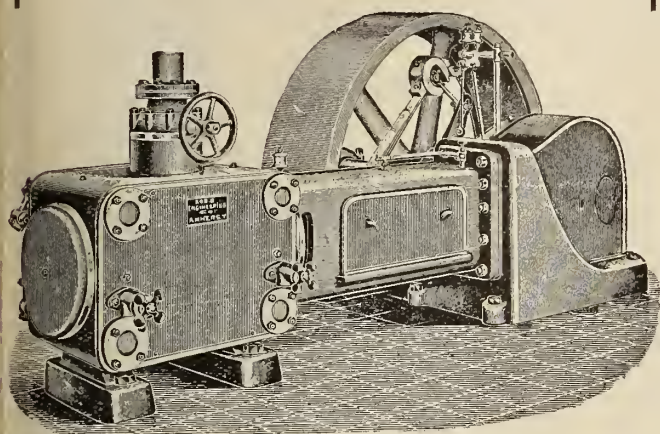
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### Engines

Corliss,  
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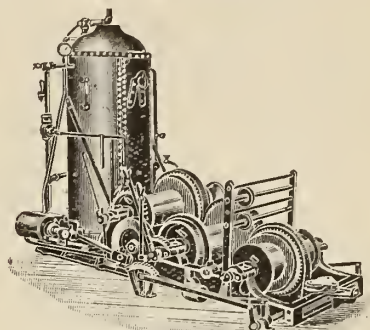
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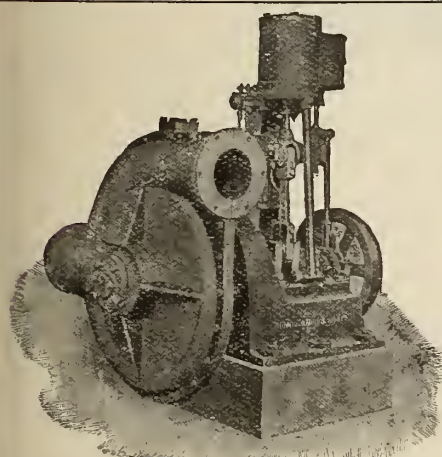
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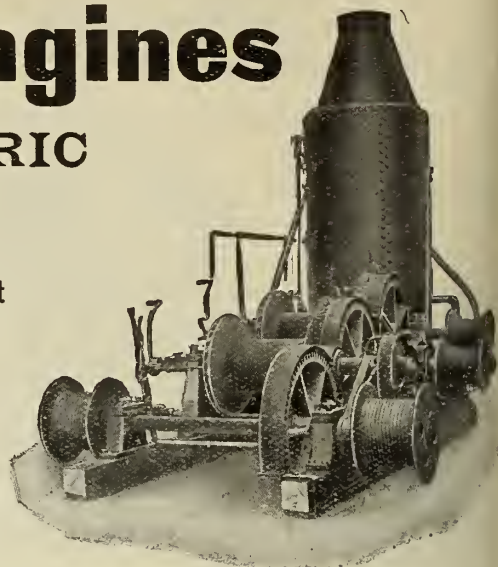
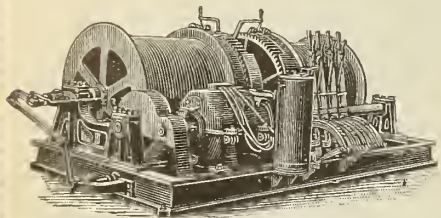
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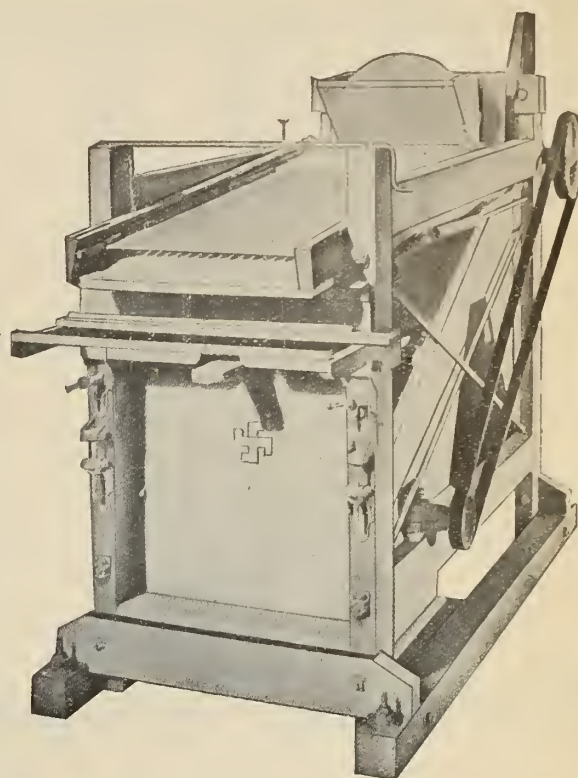
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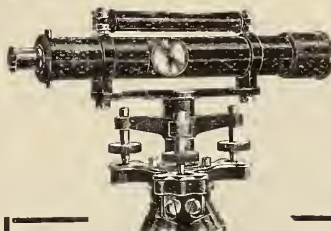
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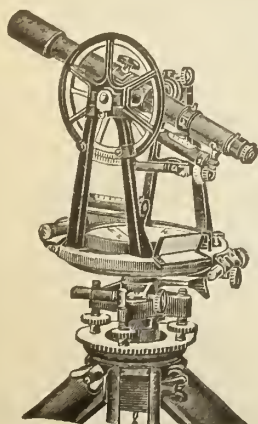
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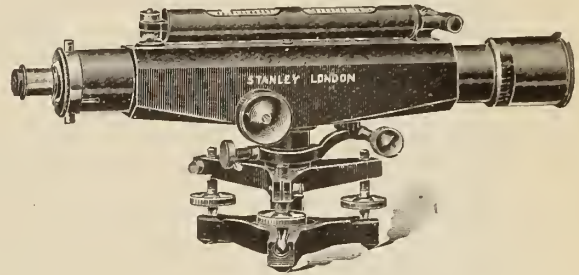
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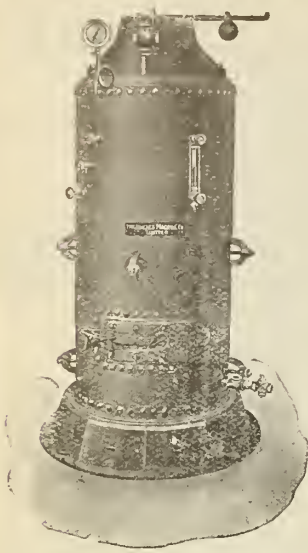
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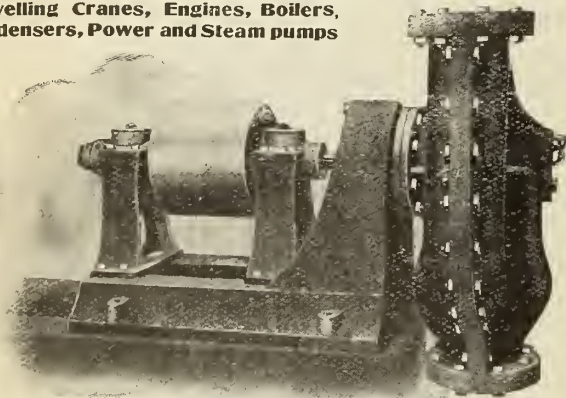
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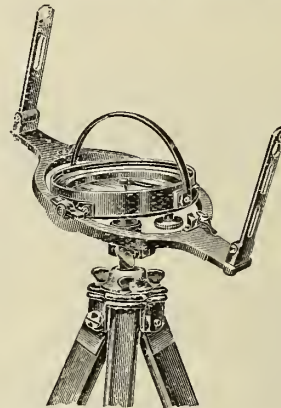
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, November 15, 1909

No. 22

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

**MINES PUBLISHING CO., LIMITED**

**Head Office** - Confederation Life Building, Toronto.  
**Branch Offices** Montreal, Halifax, Victoria, and London, Eng.

**Editor:**

J. C. MURRAY, B.A., B.Sc.

**SUBSCRIPTIONS**—Payable in advance, \$2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, \$3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

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### BRITISH AND GERMAN IRON AND STEEL TRADE.

British economists are persistently calling attention to the rapid growth of Germany's iron and steel trade. Since the year 1897, when the export bounty policy was put in operation, Germany has steadily overtaken her commercial rival. British exports of iron and steel amounted to 3,318,000 tons in 1897. In the same year Germany exported 1,069,000 tons. But during 1908 Germany's trade had grown to such an extent that exports totalled 3,732,000 tons, while Great Britain's exports aggregated only 4,233,000.

This comparison is more strongly in Germany's favour when we consider that fully one-third of Great Britain's iron exports may be classed as pig-iron. German exports of pig-iron, on the other hand, constitute hardly a twelfth of her total, and the proportion is constantly decreasing. The commercial gain to Germany, in thus selling finished products abroad, instead of raw material, is enormous.

A review of natural conditions affords no key to the situation. Raw materials can be assembled in Great Britain more cheaply than in Germany. British coal is cheaper and better. There is no great disparity in cost of labour; although the cost of living is cheaper in Germany. Transportation facilities are better in England than in Germany. What, then, has enabled Germany, with her lean ores and her poor fuel, to gain so remarkably upon her wealthier and more favoured neighbour?

In the face of natural disadvantages, Germany has sprung into second place as a producer of iron and steel. At the same rate of expansion Germany's export trade will soon eclipse that of Great Britain.

As we have seen, neither to geographic nor to other natural advantages can German progress be attributed. One outstanding feature, however, explains the strength of her position. The German iron and steel trade is perfectly organized. By a system of differentiated syndicates, not only is the trade, foreign and domestic, regulated, but a schedule of co-operative bounties was most successfully applied for a period of some years. Simultaneously with a slackening in domestic demand, the bounties rose so as to enable German manufacturers to dump their products on the British market. Similarly, when the domestic demand was strong, the bounties were lessened. Thus production was maintained, and the entire iron and steel industry kept continuously active.

The bounty regulations were in force through the period, 1897-1905. During that space of time German iron and steel exports increased 200 per cent.

That the stimulus thus administered induced a wholesome growth is not to be denied. But it was successful solely because of the complete and effectual syndication of the iron and steel interests. Each of the numerous

syndicates controls distinct kinds of products. The whole country is divided into zones, and, in the allocation of orders, the general welfare of all constituents is considered. Thus it is usual for a British order to be allotted to one particular district, Russian orders are usually placed in another, and so on. That is, foreign orders are allocated where they can be filled most advantageously. Geographical position, equipment, cost of production, are all considered.

In the development of Great Britain's iron and steel trade no such control has been present. Combinations, large and small, have been organized, but competition between individual interests has prevented any approaching the convention that exists in Germany. No tariff protects the British manufacturer. The national temperament does not take kindly to the rigid organization that appears to be the central idea of German civilization.

But, be these reasons sufficient or insufficient, the fact remains that Great Britain is falling behind, and that Germany, to a marked extent, is profiting by Great Britain's recession.

The hopeful aspects of the situation are that Great Britain is slowly becoming aware of the truth, and that she has natural advantages far greater than those with which Germany is endowed.

### LA ROSE AFFAIRS.

The first Report of La Rose Consolidated Mines Company was dated June 20th, 1908. Appended to this are three reports on the physical condition of the properties of La Rose Mines, Limited. The specialists engaged to report were, respectively, Messrs. Watson & Watson, Mr. T. R. Drummond, and Prof. Willet G. Miller.

Dr. W. G. Miller, whose report is dated August 9th, 1907, figured the silver content of ore blocked out on two sides in La Rose, 6,518 tons, at 8,020,870 ounces. Ten months later Messrs. Watson & Watson arrived at an estimate of 4,894,065 ounces as the silver contained in 10,358.17 tons of ore "practically developed" and ore "indicated." About the same time, Mr. T. R. Drummond estimated 5,303,000 ounces of silver as the probable yield of 5,484 tons of "ore available." While the basis of comparison is uncertain, owing to the divergent terminology and methods employed in the three reports, they may be used to indicate the general conditions of the mine. Mr. Drummond's estimate covers less territory than does the report of the Messrs. Watson. His figures are considerably higher for the main vein, No. 3 vein, and McDonald No. 5. Hence it is most suitable to take, for purposes of discussion, the Watson estimate of 4,894,065 ounces as the amount of silver indicated at the end of the fiscal year 1907-1908.

The output of La Rose as between August, 1907, and June, 1908, was approximately 900,000 ounces.

Taking Dr. Miller's figures, and disregarding any reserves added during that period, this would leave 7,120,870 ounces of silver in ore blocked out on two sides. As noted above, the total "practically developed" silver in almost twice the tonnage of ore, ten months later, is given by Messrs. Watson & Watson as 4,894,065 ounces, a discrepancy of more than two million ounces.

During the fiscal year ending June 1st, 1909, silver was shipped from La Rose to the amount of 2,979,953.97 ounces. Partly developed ore at that date is reported by Mr. R. B. Watson to contain 4,307,705 ounces. To this total may be added 454,013 ounces contained in "McDonald" country rock, and 206,700 ounces "indicated" in No. 3 vein, making a grand total of 4,968,418 ounces contained in ore reserves.

As plans and sections of the mine do not accompany either the annual or the special reports, and as Mr. Watson makes only vague reference to progress and does not specify the footage made on any vein, it is impossible to analyze the figures referred to above. We may remark here that this omission is inexcusable. Shareholders should insist upon detailed information as to progress and development. That this is necessary is amply proved by the history of La Rose itself. The general manager's report should be an actual history of work done in each section of the mine. If this has been prevented heretofore by speculative interests there is all the more reason that the objectionable policy of repression be discontinued at once. In this we are confident that General Manager R. B. Watson will concur. He is looked upon as a competent engineer. Until now he has had no opportunity to prove himself anything but an important cog in an elaborate stock-market device.

Roughly, the position of La Rose to-day may be summed up thus:—

The total capitalization is about \$7,500,000. Since organization of La Rose Consolidated the net value of silver shipped aggregates now about \$1,750,000. No profits to be expected from ore reserves, on Mr. Watson's estimate, will hardly equal this sum. No substantial development work has been performed on the other properties. Lawson, according to general belief, has not by any means lived up to its promise. The attention of the executive has been devoted, not to putting La Rose and the subsidiary mines in good condition, but to unloading their stock at the top of the market. Having accomplished this, most especially and most regrettable in London, the chief manipulators resigned and new directors were appointed.

We may interject here one or two questions that are decidedly pertinent. As pointed out above, there is a possibility of comparing the three estimates mentioned in our first paragraph. But we may ask Mr. Watson, in estimating his reserves, he is revaluing part of his reserves, or touching new ground entirely? What are where are his reserves, anyway? How do they che



with Dr. Miller's estimate of "tonnage and possible tonnage" published in the First Annual Report, which places the total productive capacity of veins then known at 12,871,750 ounces? Indeed, the more we examine the published statements of La Rose Consolidated, the less we find to enlighten us. But it is surely unfair to expect us to accept bald statements of reserves with absolutely no physical data.

It is not our belief that La Rose is to be a fiasco. A competent general manager, strong enough to resist market influences, and backed by the majority of his directors, will undoubtedly pull the fat out of the fire. We hope that La Rose possesses both the proper manager and the proper directorate. We do not *know* that this is the case. Knowledge will come soon enough.

### LIBRARY MEMORIAL TO HUGH FLETCHER.

The Mining Society of Nova Scotia has decided to raise four thousand five hundred dollars for the purpose of establishing a Memorial Library in honour of the late Hugh Fletcher. The library will consist entirely of books on geological and mining subjects. The Provincial Government is to be asked for permission to place the library in the new Technical College building.

British business enterprise is in nothing more evident than in the shipments of coal to Europe. Austria, for instance, is largely supplied by Great Britain. Trieste, on the Adriatic coast, is an important industrial centre and distributing point. To this city Great Britain shipped 804,000 tons of sea-borne coal during 1908. More than half of this quantity came from Northumberland, the remainder from South Wales and Scotland. Entries of Austro-Hungarian coal amounted only to 73,000 tons.

### RADIUM.

A significant event was the laying of the foundation stone of a large radium reduction works at Limehouse, England. The ceremony took place on October 16. Lady Ramsay, the wife of the renowned scientist, Sir William Ramsay, laid the stone.

This new enterprise, launched under the name of the British Radium Corporation, is the outcome of a combination of interesting and peculiar circumstances.

Associated with the British Radium Corporation is the St. Ives Consolidated Mines, Ltd., which controls an important group of tin mines in Cornwall. Among these tin mines is the Trenwith, which, in former years, was a copper producer. Early in the last century, so run the records, pitchblende was found in quantity. This mineral the miners mistook for black copper. On account of this delusion there was serious friction with the smelters. But the difficulty was cleared in 1843, when Professor Henwood identified the mineral rightly as pitchblende. After that this valuable ore of radium and uranium was considered a waste product.

The British Radium Corporation was organized to treat this neglected ore. The process to be used was devised by Sir William Ramsay. The method now in use on the Continent occupies at least twelve months. By Sir William's process a great saving of time will be effected. The whole treatment of the pitchblende will not occupy more than seven weeks.

The efficacy of radium as a cure for certain diseases, including cancer, is one of the beneficent discoveries of modern science. Sir William in his speech on this occasion alludes to the desirability of supplying the British Empire before allowing any of the precious element to be purchased abroad. Neither Austria nor Germany permits radium to be exported. Their example, according to Sir William, should be followed.

### CANADA'S ARCTIC DOMAIN.

History, written and unwritten, accentuates one fact. The nation that lays claim to territory must occupy that territory. The incidents of the Alaskan award, and of the adjustment of the International Boundary between Canada and the United States lend force to this. Skagway should never have been turned over to our neighbours; nor need it have been had Canada been early alive to her own interests.

In a recent newspaper interview, Mr. J. B. Tyrrell, who may be justly termed our leading authority on the Arctic and sub-Arctic regions of the Dominion, expressed his belief that the northern shore of the Dominion and the Arctic islands lying between the mouth of the Mackenzie River and the north-west extremity of Hudson Bay should be thoroughly explored. At present Canada has no substantial title to these lands. A vague suzerainty, based upon geographical considerations, constitutes our only hold upon territory that may be of immense value.

Mr. Tyrrell urges that the Dominion Government regularly appropriate a few thousands of dollars to equip an expedition to investigate the natural resources of these northern lands. This form of occupation has international value. It also may bring to light mineral deposits of great commercial importance.

Alaska, once looked upon as a white elephant, has returned a hundred times over the few millions paid for it by the United States, and its development has scarcely begun.

Disregarding altogether the sentimental aspects of the case, the exploitation of the Dominion's northern fringe is a practical duty that our Government must no longer neglect.

### CONCRETE IN METAL MINING.

Not only is concrete growing in favour as a substitute for timber in metal-mining, but the advantages of using it in sinking shafts in wet ground and in keeping water out of underground workings are rapidly being

recognized. Mr. Henry W. Edwards, in an article reproduced in this issue by special permission of The Engineering Magazine, outlines very usefully the uses of concrete underground.

We consider this article well worthy of reprinting. It brings before our readers a subject that will sooner or later obtrude itself in established mining camps. The utilization of concrete must command attention for several reasons. The supply of mine-timber gradually grows less. It is extremely difficult to conserve this supply. On the other hand, experience is proving that concrete may sometimes effectively replace timber, even where supplies of the latter are abundant. Concrete, moreover, can be utilized where timber cannot. Concrete is infinitely plastic and can be made to assume any desired shape. Its component materials can be assembled and mixed without excessive cost in almost any locality.

The whole question resolves itself into a problem of economics and of engineering skill. Only the fringe of the subject has been touched.

### THE ANNUAL REPORT OF THE ONTARIO BUREAU OF MINES.

Part I., Vol. XVIII., of the Annual Report of the Ontario Bureau of Mines appears just as we are going to press. In a later issue we shall discuss it adequately. At present we wish to express our appreciation of the careful and masterly Statistical Review that takes up the first seventy pages of this volume. The Deputy Minister of Mines, Mr. T. W. Gibson, is personally responsible for this section, and it is notably workmanlike, comprehensive, and clear.

### EDITORIAL NOTES.

The public will give thanks for the latest volume issued by the Geological Survey. "A Descriptive Sketch of the Geology and Economic Minerals of Canada," compiled by Dr. G. A. Young under the direction of the Survey. The book is a model of clean editing and intelligent selection. In both respects it is superior to any official Canadian publication. It gives a bird's-eye view of the economic geology of the Dominion. Extended notice is given on another page.

Western railroads have granted valuable concessions to the Los Angeles Chamber of Mines. The Chamber is endeavouring to assemble in Los Angeles a mining and oil exhibit. To aid this good work the railroad has consented to carry free of charge all ore and oil exhibits.

Shipments of 50,000 tons of Chinese pig iron are to be made to New York at prices that compare favourably with Pittsburg quotations for delivery on the

Atlantic seaboard. The chief iron works of the Chinese Empire are situated 750 miles inland on the Yangtse River, near Han Kow. Cheap labour, excellent ore and good coal all contribute to the low production costs. The possibility of such shipments being made re-adjusts our ideas of international commerce.

### MEXICAN MINING COSTS.

Mexico Mines of El Oro, Limited, is a corporation subsidiary to the El Oro Mining and Railway Company, Limited. It operates the Mexico mine, near the town of El Oro, Mexico. The company's record is worth noting.

Organized in 1904, the company had its plant completed and running in October, 1907. The positive ore reserves in June of that year amounted to 178,240 tons, carrying \$11.53 gold and 6.9 ounces silver per ton. The equipment as completed in October, 1907, consisted of a 40-stamp mill, six-tube mill, and a cyanide plant.

It was expected at first that the stamp-mill would crush 200 tons per day. In two years that expectation has been nearly doubled. At present the 40 stamps crush 378 tons per day, a duty of 9.45 tons per day per stamp.

Last year, ending June 30, 1909, the ore averaged \$13.47 in gold per ton. The mill treated 110,105 tons, getting an average extraction of \$12.44 per ton, a recovery of 92.35 per cent.—94.46 of the gold and 87.35 of the silver. During the previous year the recovery was 89.6 per cent.

The total working cost was \$5.67 per ton, as compared with \$6.33 for the preceding year. Development and State and Federal taxes amounted to \$1.64 per ton in the past year, while in the previous year they averaged only \$1.27. Thus the reduction in working costs is 40 cents greater than would appear.

By increasing the duty of the tube-mills it is hoped to bring the costs down still further.

The present ore reserves amount to 191,655 tons, almost two years' supply at capacity of mill.

### VOLCANIC GAS.

Through long years Mr. Eugene Coste has contended for the inorganic origin of natural gas and petroleum as opposed to the organic origin. Mr. Coste's papers on the subject in the publication of the Canadian Mining Institute have attracted much attention but his converts have been few. Of course most of us who have attended the annual meetings had to accept the theory (outwardly at least) and now it is receiving support from no less an authority than Dr. Becker, of the U. S. Geological Survey, "an unexpected source."

To Mr. Coste's long-continued, "vigorous, almost polemical, writing is mainly due the renewed interest in the long dormant theory of the inorganic origin of petroleum." Can we say to Mr. Coste "patience and perseverance made a bishop of his reverence"? Or is the conundrum sprung by that punster, Mr. Mickle, during one of the hot debates at a meeting of the Institute in Montreal some years ago appropriate: "What is the difference between a vegetarian and a man who believes in the organic origin of gas?" Give it up! "The one draws the line at meat while the other will swallow anything."



## HUGH FLETCHER.

Written for The Canadian Mining Journal by Mr. R. W. Brock,  
Director of the Geological Survey of Canada.

Through the death of Hugh Fletcher the Geological Survey lost one of its oldest and most respected officers. He was born in London, England, of Scotch parents in the year 1848. At the age of 12 he came to this country with his father, a well-known mining engineer.

His education was received in Ontario. At Toronto University he took a brilliant course, securing the gold medal in modern languages, the silver medal in natural science, and the Prince of Wales prize in general proficiency. His first practical experience was obtained in the gold mines at Tangier, N.S., where his father was manager. In 1872 he was appointed to the Geological Survey of Canada as assistant to Mr. Charles Robb, then engaged in a study of the coal fields of Cape Breton. Of Mr. Robb's work and the training he received while under him Mr. Fletcher always spoke in the highest terms. Upon Mr. Robb's retirement in 1875 Mr. Fletcher was given charge of the work in Cape Breton, and from that time until his death in the field, his life has been unsparingly devoted to the study of the geology of Nova Scotia. His work included the survey of Cape Breton and the counties of Cumberland, Colchester, Pictou, Antigonish, Guysborough, Kings, Hants, and a portion of Halifax.

For more than thirty years he has been an accepted authority on the geology and mineral resources of Nova Scotia, more particularly as regards coal and iron. The published results of his work are largely confined to Geological Survey publications as given in the appended list. Like that of many other strong men, the value of his work is in the inverse ratio to the number of printed pages describing it. The greater part is represented graphically on the maps which he made, Mr. Fletcher being a strong believer in this method of recording information and presenting it to the public. The long list of maps prepared under his hand on a scale of one mile to an inch, with every feature shown, accurately located, and in greater part from original surveys by Mr. Fletcher, evidences the patient, painstaking, untiring work of this geological explorer. These maps are accepted as standard for geographical features, as well as for geological. During his long life

of active research in Nova Scotia he steadily acquired a mass of detailed information concerning this province, so that his knowledge of it became encyclopedic. He was ever ready to give the benefit of his knowledge and experience to any enquirer. Probably the most valuable of all the assistance the Survey can render is not that given through the printed report, but that furnished by officers in the field to individuals on the ground. In Mr. Fletcher's case his assistance was cheerfully accorded, and to an unusual extent.

As his active field life was spent wholly in Nova Scotia it is there that he and his work (they are always associated) were best known. The high estimation in which both were there held would amply repay the most self-sacrificing public servant. It is to the credit of Nova Scotia that this appreciation was not withheld until too late to reward, cheer and inspire this devoted worker.

As might be surmised from his wide circle of friends and admirers, Mr. Fletcher possessed a striking and winning personality. He was intensely loyal to his ideals, devoted to what he conceived to be duty, and persistent in his endeavours. His work was characterized by care, accuracy and system. It is as yet too soon to estimate the place he will occupy among the unravellers of Canadian geology, but no matter what advances be made in the science, his work will remain as fundamental. New terms may be introduced and formations differently grouped and subdivided as further light is thrown on the geological problems, but when work has been done with the precision and care that characterizes Mr. Fletcher's, such changes are merely readjustments.

It was his ambition to finish the mapping of his portion of Nova Scotia, and to embody in one report the results of his years of labour. His first wish was practically realized. The last, unfortunately, was unattained, and must be undertaken by other hands. He died, as he would have chosen, in harness, and amid the hills of his well-loved Nova Scotia.

Mr. E. R. Faribault, his colleague in Nova Scotian geology, is an old assistant of Mr. Fletcher, and the training he received at his hands is reflected in the detailed accuracy of his work.

### Bibliography of Hugh Fletcher.

#### A. Geological Survey Publications, Reports.

- G. S. No. 108. Report of Explorations and Surveys in Cape Breton. (Pt. No. 108, 1875-6.) H. Fletcher.
- 114. Report on the Geology of portions of the Counties of Victoria, Cape Breton and Richmond. (Pt. No. 114, 1876-7.) H. Fletcher.
- 125. Report of Explorations and Surveys in Cape Breton. (Pt. No. 125, 1877-8.) H. Fletcher.
- 147. Report of Surveys of portions of the Counties of Richmond, Inverness, Guysboro', and Antigonish, from Chedabucto and St. Peters Bays to Judique and Denys Basin. (Pt. No. 147, 1879-80.) H. Fletcher.

- 167. Report on the Geology of the portion of Cape Breton north of Judique and Denys Basin. (Pt. No. 167, 1882-3-4.) H. Fletcher.
- 243. On Geological Surveys and Explorations in the Counties of Guysboro', Antigonish, Pictou, Colchester and Halifax. H. Fletcher and E. R. Faribault.
- 331. Report on Geological Surveys and Explorations in the Counties of Pictou and Colchester. H. Fletcher.
- 1021. Explorations in Nova Scotia. (Summary Report, 1907.)
- Geology of Southwestern Nova Scotia. (Summary Report, 1894, p. 89.)

- Sydney Coalfield, N. S. (Summary Report, 1895, p. 105.)  
 Coal Deposits of Cape Breton. (Summary Report, 1896, p. 94.)  
 Surveys in Western Nova Scotia. (Summary Report, 1897, p. 98.)  
 Springhill Coalfield, N. S. (Summary Reports, 1898, p. 139; 1899, p. 162.)  
 Springhill and Inverness Coalfields, N.S. (Summary Report, 1900, p. 162.)  
 Kings and Hants Counties, N.S. (Summary Report, 1901, p. 210.)  
 Surveys and Explorations in Richmond, Cape Breton, Kings, Cumberland and other counties. (Summary Report, 1902, p. 390.)  
 Northern part of Nova Scotia. (Summary Report, 1903, p. 160.)  
 The Counties of Cumberland, Hants, Kings and Annapolis, N.S. (Summary Report, 1904, p. 293.)  
 Geological Work in Northwestern Nova Scotia. (Summary Report, 1905, p. 118.)  
 Surveys in Western part of Nova Scotia. (Summary Report, 1906, p. 140.)  
 Explorations in Nova Scotia. (Summary Report, 1907. See at end.)  
 On a portion of Cumberland County, N.S. (Summary Report, 1908, p. 143.)

#### B. Papers Read Before Scientific Societies.

- The Sydney Coalfield. From Trans. of the Mining Society of Nova Scotia. Vol. 3, pp. 112-124. (With map.) 1894-95.  
 Geological Nomenclature in Nova Scotia. From Trans. Nova Scotia Inst. Science. Vol. 10, pp. 10. 1899-1900.  
 Limits of the Workable Coals of the Cumberland Coalfields in Nova Scotia. From Trans. of the Mining Society of Nova Scotia. Vol. 8, pp. 123-126. 1903-4.  
 A Section of Carboniferous Rocks in Cumberland County, N.S. From Shubic to Spicer Cove. From Proceedings and Transactions of the Nova Scotia Institute of Science. Vol. 11, Part 3, pp. 500-548. 1904-05.

#### C. Publications of the Geological Survey—Maps.

Note.—A few of these maps were made with the assistance of Mr. Faribault, Dr. Ellis or others.

##### General Maps. Nova Scotia.

- G. S. No. 105. Cape Dauphin District. Report, 1874-75. Scale 20 chains to 1 inch.  
 106. Eastern Part of Sydney Coalfield. Report, 1874-75. Scale 1 mile to 1 inch.  
 113. Western Part of the Sydney Coalfield. Report, 1875-76. Scale 1 mile to 1 inch.  
 124. Grand Narrows Sheet. Report, 1876-77. Scale 1 mile to the inch.  
 131. Louisbourg Sheet. Part F., 1877-78. Scale 1 mile to 1 inch.  
 764. Geological Sketch Map of parts of Kings and Hants Counties, N.S. Part A., Vol. XIV. Scale 2 miles to 1 inch.  
 812. Preliminary Geological Map of Springhill Coalfield. Part A., Vol. XV. Scale 50 chains to 1 inch.  
 833. Map of Pictou Coalfield. Part M., Vol. XIV. Scale 25 chains to 1 inch.

897. Preliminary Geological Plan of Nictaux and Torbrook Iron District, N.S. Part A., Vol. XVI. Scale 25 chains to 1 inch.

##### Serial Geological Sheets—Scale 1 mile to 1 inch.

184. Sheet 1. Cape North Sheet. Part H., 1882-83-84.  
 185. Sheet 2. Aspy Bay Sheet. Part H., 1882-83-84.  
 186. Sheet 3. Pleasant Bay Sheet. Part H., 1882-83-84.  
 187. Sheet 4. Ingonish Sheet. Part H., 1882-83-84.  
 188. Sheet 5. Headwaters of Cheticamp River Sheet. Part H., 1882-83-84.  
 189. Sheet 6. North Cheticamp Sheet. Part H., 1882-83-84.  
 190. Sheet 7. North Shore Sheet. Part H., 1882-83-84.  
 191. Sheet 8. Headwaters Margaree River Sheet. Part H., 1882-83-84.  
 192. Sheet 9. South Cheticamp Sheet. Part H., 1882-83-84.  
 193. Sheet 10. Englishtown Sheet. Part H., 1882-83-84.  
 194. Sheet 11. Margaree Sheet. Part H., 1882-83-84.  
 195. Sheet 12. Baddeck Sheet. Part H., 1882-83-84.  
 196. Sheet 13. Middle River Sheet. Part H., 1882-83-84.  
 197. Sheet 14. Broad Cove Sheet. Part H., 1882-83-84.  
 198. Sheet 15. Whycoemagh Sheet. Part H., 1882-83-84.  
 199. Sheet 16. Port Hood Sheet. Part H., 1882-83-84.  
 200. Sheet 17. Loch Lomond Sheet. Part F., 1879-80.  
 201. Sheet 18. River Denys Sheet. Part F., 1879-80.  
 202. Sheet 19. Judique Sheet. Part F., 1879-80.  
 203. Sheet 20. L'Ardoise Sheet. Part F., 1879-80.  
 204. Sheet 21. Saint Peter Sheet. Part F., 1879-80.  
 205. Sheet 22. Strait of Canso Sheet. Part F., 1879-80.  
 206. Sheet 23. Arichat Sheet. Part F., 1879-80.  
 207. Sheet 24. Guysborough Harbour Sheet. Part F., 1879-80.  
 385. Sheet 31. Roman Valley Sheet. Part P., Vol. II.  
 386. Sheet 32. Pomquet Harbour Sheet. Part P., Vol. II.  
 387. Sheet 33. Cape George Sheet. Part P., Vol. II.  
 388. Sheet 34. Antigonish Sheet. Part P., Vol. II.  
 389. Sheet 35. Lochaber Sheet. Part P., Vol. II.  
 390. Sheet 36. West River St. Marys Sheet. Part P., Vol. II.  
 593. Sheet 42. Trafalgar Sheet.  
 598. Sheet 43. Stellarton Sheet.  
 600. Sheet 44. New Glasgow Sheet.  
 608. Sheet 45. Toney River Sheet.  
 609. Sheet 46. Pictou Sheet.  
 610. Sheet 47. Westville Sheet.  
 633. Sheet 48. Eastville Sheet.  
 635. Sheet 56. Shubenacadie Sheet.  
 636. Sheet 57. Truro Sheet.  
 637. Sheet 58. Earltown Sheet.  
 793. Sheet 59. Tatamagouche Sheet.  
 794. Sheet 60. Malagash Sheet.  
 795. Sheet 61. Pugwash Sheet.  
 796. Sheet 62. Wentworth Sheet.  
 836. Sheet 63. Londonderry Sheet.  
 837. Sheet 64. Noel Sheet.  
 878. Sheet 65. Kennetcook Sheet.  
 879. Sheet 74. Walton Sheet.  
 838. Sheet 75. Five Island Sheet.  
 839. Sheet 76. Pleasant Hills Sheet.  
 840. Sheet 82. Southampton Sheet.  
 841. Sheet 83. Parrsborough Sheet.  
 826. Sheet 100 (and 101). Apple River Sheet.  
 652. Sheet 133. Cape Dauphin Sheet. Report No. 685.  
 653. Sheet 134. Sydney Sheet. Report No. 685.  
 654. Sheet 135. Little Glace Bay Sheet. Report No. 685.



# APPLICATIONS OF CONCRETE IN THE METAL MINING INDUSTRY.

By Henry W. Edwards.

(Abstract of article from The Engineering Magazine reproduced here by special permission.)

Concrete, used for the mere purpose of supporting unsafe ground is gaining but slowly in favour, being confined for the present to an occasional tunnel portal, to lining shafts through surface soil down to solid rock, and to a very limited use of "stulls." In the coal-mining industry much greater use is made of concrete for all purposes; but it is not the intention in this article to touch upon that branch.

The chief advantage of concrete for lining shafts through the surface soil and down to bed-rock, outside of its durability, is its efficiency in keeping out water. The upper part of the lining is usually so shaped and extended as to form the foundations for the hoisting machinery. The rounding shape, or arched effect, shown in recent illustrations published, is of no particular advantage for vertical shafts, although it is quite necessary if the lining be made of brick or stone. Even in small mining operations, if the surface soil be wet no time should be lost in protecting the shaft with a watertight lining, which should be extended upward above the floor line sufficiently to form a kerb around the mouth of the shaft to prevent the rain water or rubbish from falling in. Arrangements for supporting the ordinary shaft equipment of cage-guides, ladders, pipes, etc., must be well thought out beforehand in order to avoid having to cut into the concrete after it has set. Shaft linings are comparatively simple in vertical shafts, but inclined shafts do not lend themselves quite so easily to placing the forms and ramming the concrete but not even these require any very high order of ingenuity. In this latter case the upper part had perhaps better be made arching and, if possible, reinforced either with specially purchased iron or with whatever old material may be available on the spot, such as old rail or pipe. A neat method for shaft lining is to make slabs of concrete three or four inches thick by two or three feet square, which when properly hard are placed and supported against the sides of the shaft, the space between them and the soil or rock being filled with concrete well rammed in; these slabs are left permanently in position.

It is as a means of controlling water underground that concrete is growing in favour rapidly. It is a much better stroke of business to keep water out of a mine than to pump it out. As an instance, at the Candelaria mine, in Mexico, the great influx of water was found to be at a point midway between the first and second levels, about 160 feet from the surface. A portion of this water was very ineffectually trapped on the second level by means of wooden troughs and pumped thence to the surface, but the great bulk of the water found its way to the bottom of the shaft at 700 feet. Raising the water from this depth to the surface necessitated a continuous effort at the pump to overcome some 630,000 foot-pounds. What with condensation in such a long steam line, pipe friction, etc., this amounted to something over 30 horse-power at the boiler. It was therefore decided to arch over the second level from the shaft completely to the end. This being done, the water, thus completely confined above the arch, was pumped only 200 feet to the surface. The pump at the bottom

of the mine was then able in a few hours' work per day to take care of all the water seeping into the mine below this level. The saving in reality was found to be more in money than was represented by the steam saved, the men being much more efficient in the more agreeable circumstances, besides the heavy bills for repairs to the pump being much diminished. The forms used in this work consisted of two segments from an old steam boiler, lapped over one another to a greater or less degree to accommodate the variable width of the level, the smaller irregularities being closed by scraps of boards or sheet iron or anything else that came handy. As elegance and finish are not considered necessary underground the marks left by these were not smoothed off. The preliminary work, having for its object the preventing of the water from washing over the wet concrete, was much more difficult and engaged much more attention than the mere construction of the arch.

At the San Blas mine, also in Mexico, in sinking a shaft 8 feet by 12 feet in area, a heavy flow of water was encountered at 90 feet from the surface, through a fissure which crossed the shaft at about a 25-degree angle. The flow of water was such that in spite of the most energetic efforts only eight feet of progress was made in a month. We therefore enlarged the shaft, in an irregular outline, for two or three feet on each of its four sides for a belt of about three or four feet above the fissure and about the same distance below. After the water had risen to its natural level in the shaft, some 250 tons of concrete were dumped in and allowed several weeks to set. The water was then pumped out and the shaft re-excavated through the concrete and carried down to 400 feet without further trouble. Had a central hollow core been left in the concrete the work of sinking through it would have been very much diminished. The total cost of this work did not exceed \$2,200, including the re-excavation of the shaft, the cement costing, delivered at the spot, \$4.50 per barrel.

It may be as well to indicate the precautions necessary to secure a successful issue to a piece of work of the above sort. First, the water should be without movement, or the flow be at least imperceptible. For this reason the shaft was allowed to fill up to its natural water level. Second, the concrete should not be dumped in and allowed to fall to the bottom, causing a separation of the heavier from the lighter ingredients. In the case cited the concrete was lowered in a wedge-shaped bucket, one side of which was hinged at the top and fastened at the bottom by a latch to which was attached a wire leading to the surface. When the bucket was lowered and placed as nearly as possible in position the wire was pulled, releasing the concrete without giving the cement much opportunity to separate from the other ingredients. Third, the re-excavation must be made without the aid of explosives. Fourth, ample time must be allowed for the concrete to solidify.

For "timbering" underground, concrete "timbers" are attracting a certain amount of attention. The average life of a pine timber or stull in a mine may not be counted on to exceed four years, while the life of a concrete "timber" is indefinite; it costs more in the

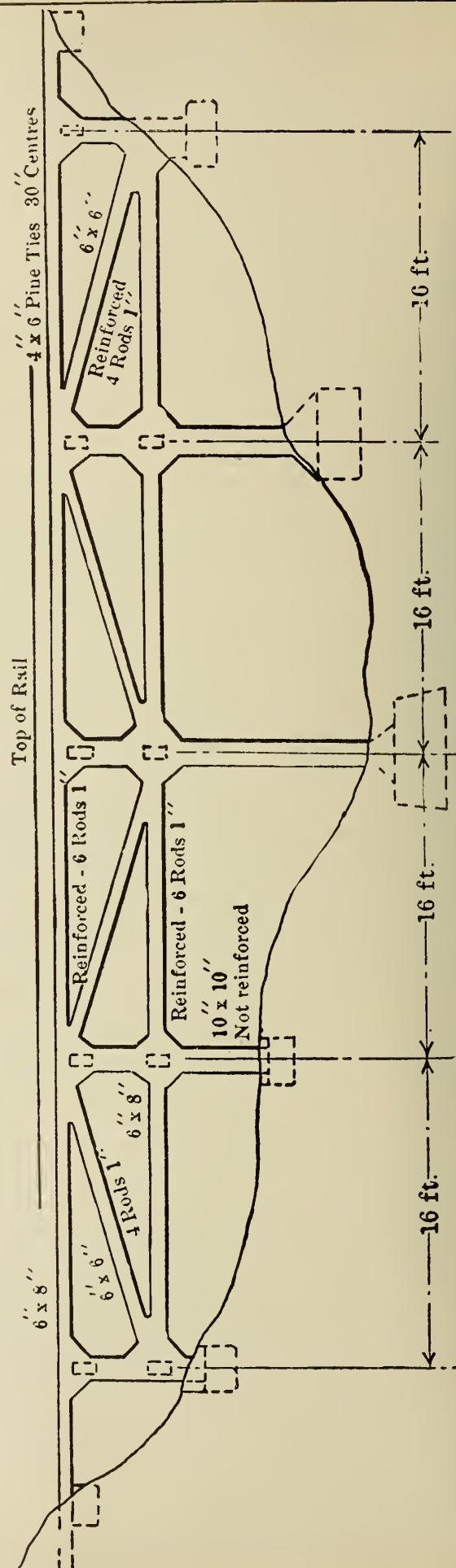
first instance and, owing to its weight, it is more costly to place in position. Concrete timbers are easily made in long wooden troughs, or in split tubes of sheet iron, with the ends adjusted so that they can be changed to suit the desired length and angle of cut. If it is possible to do so, the form should be set close to where the stull is to be finally placed. The conspicuous disadvantage of the concrete stulls is the difficulty in placing them at the proper angle with regard to the line of thrust of the ground to be supported. Frequently when the ground being supported settles to a small extent the angle of thrust is greatly changed; in such a case a pine timber is easily wedged up, or the ends cut to a new angle, or the position of the whole thing changed to suit the new conditions; once a concrete timber is in place any changes are very difficult. Up to the moment of writing, the greater use of concrete stulls and timbers is in replacing rotted ones. In this case the ground having already settled and the wooden stulls having been subjected to observation for a considerable period of time, the concrete props can be placed with more intelligence, not only as to the direction of the lines of force, but also as to the amount of strain they are to be called upon to resist. Both of these factors are usually only partially known in the first instance.

As a general proposition, the use of reinforcement, either of scrap material or of some one of the many special shapes of iron, is not very usual for underground work in the metal-mining industry. For surface structures, however, we follow all the usual rules of such constructions. Portions of the various structures in which the stresses are exclusively in compression do not require reinforcement.

These statements suppose the use of cement of good quality, which, in out-of-the-way places, is not always obtainable. It is of very little use to attempt to test the cement for the purpose of comparing the results obtained with the figures obtained by the manufacturers. So many factors are not uniform with the conditions under which the experiments are made at the factory that the final results are quite different. The age of the cement, difference of temperature and humidity of the air, of the water or of the cement itself, and even the nature and amount of the various mineral substances dissolved in the water, all together introduce such differences as to make it a waste of time to make any other tests than the actual mixing and laying of a small preliminary batch of concrete. About the only exterior indication of defective quality is the swelling of the barrels when they have been too long in stock in a humid climate or have accidentally been wetted. It seemed a pity that no way could be found to stamp each barrel reliably with the date it left the factory like the photographic supplies. If it be possible, the engineer will do well to purchase his cement direct from some manufacturer of a standard brand and not to depend on purchasing from local merchants.

As a general rule there is nothing at any mine in the way of surface structures that cannot be made, and better made, of concrete than of any other material—head frames, ore bins, floors, buildings, electric-wire poles, trestles, water pipes for low pressure, boiler settings, chimney stacks, tanks of all kinds, and even boats and lighters if the mine have use for these latter.

As to head frames, the strains of hoisting are converted entirely into compression in these structures, and concrete is, therefore, exceedingly appropriate. One of the most satisfactory head frames I have put in had for its principal members two old sheet-iron smoke stacks, each 28 inches in diameter by 50 feet high. These were

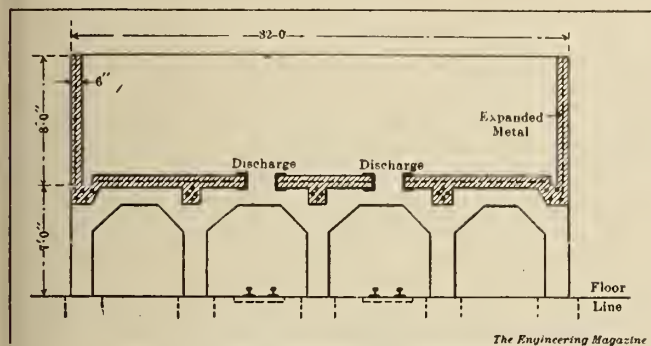


REINFORCED-CONCRETE BRIDGE FOR 20-INCH GAUGE MINE TRACK.  
For mule hauling three cars each 1500 pounds net load



filled with concrete, section by section. As just remarked, all the strains in these structures being resolved into compression in the direction of the resultant of the engine pull and the ascending load, it would appear that a head frame need consist of a single strut only, placed in the plane of this resultant, and that any other members would be superfluous except such feeble ones as might be necessary to support the main strut in the proper attitude while not in use. Concrete head frames are cheaper than steel, and, moreover, are not subject to the violent and unpleasant vibration of the steel construction. This vibration may be done away with entirely by casing the steel structure with concrete.

In the making of tanks for water or for the cyanide process or for slime settlers, reinforced concrete is most adaptable. Recent changes in the manipulation of the cyanide process have involved the use of tanks which rather puzzle the wooden tank manufacturer, particularly those tanks with conical bottoms. The maker's difficulty in these tanks comes in keeping the hoops from slipping down the conical part, or in finding any really satisfactory substitute for hoops. For the concrete man these difficulties do not arise; he has no bounds of shape nor size nor position, nor is he called upon to handle material of unusual dimensions, nor, like the iron tank man, is he obliged to send a gang of riveters, say from Pittsburg to Nicaragua, to rivet up a set of tanks shipped in sections.



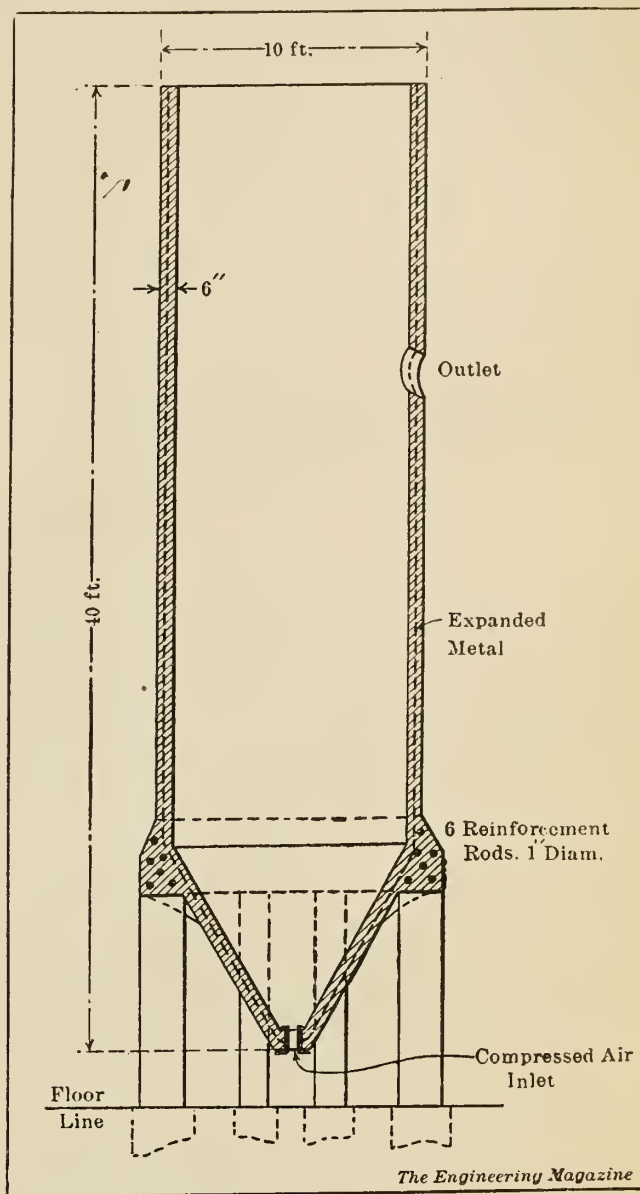
CYANIDE VAT OF REINFORCED CONCRETE.

Another essential part of the cyanide plant is the system of launders or troughs for conveying the solutions from tank to tank. When made of wood these launders are not difficult, so long as they are straight; but when curves or junctions become necessary, then the difficulties of making them absolutely watertight begin. Concrete launders can be made as complicatedly crooked as may be convenient, with perfect freedom from leakage, and, moreover, if allowed to dry, they do not shrink, like wood, opening up cracks where none previously existed.

The former method of building cyanide tanks was by lining, with heavy concrete excavations partly or wholly below ground level. The modern reinforced concrete cyanide tank is an elevated structure upon concrete pillars, with its bottom and all its other parts as accessible to inspection and repairs as an iron or wooden tank. In the modern construction of cyanide tanks "expanded metal" or a system of iron rods and wires forms the reinforcement: the concrete, some 6 inches in thickness, is thoroughly trowelled over with neat cement on the inside in order to close up the pores of the concrete. Any offsets or fastenings for filters or outlets or inlets are all provided for in the wet concrete. Should small cracks develop so as to expose the iron reinforcement to contact with the cyanide solution, no

harm will result, as the solution is entirely without action on iron. A good preliminary paint coating may be made by emulsifying soap and water and kerosene oil (in about equal weights of the three ingredients), after which the tanks may receive two coats of the usual paint sold for cyanide work.

The "pointed boxes" and other similar appliances used in the concentration mill are made in a similar manner with expanded metal, or rods and wire, and may be relied upon to give better service than either



REINFORCED-CONCRETE CYANIDE VAT, PACHUCA PATTERN.

wooden or iron apparatus. For dressing ores, concrete made with a smooth finish of neat cement offers an excellent surface to which some minerals appear to cling more than others. I had in use in Arizona two revolving "buddles" of 12 feet diameter made in this manner. The ore there consisted of several minerals, among them a copper-gold-silver mineral, valuable, and a zinc-sulphide, valueless. In passing the crushed ore over the buddles for washing off the rock matter, it was noted that the proportion of zinc sulphide gotten rid of

on these machines was greater than in any of the other appliances in the mill.

Trestles for the ordinary mine tramway are very striking instances of the advantage of reinforced concrete, especially in districts where timber has to be transported great distances. The difficulty and expense of carrying long timbers for the chords is enormous as compared with the carrying of cement, and the differences become more and more evident as the distance increases, and finally the timber becomes prohibitive when mule-back is the only means of transportation. Only about 15 per cent. of the bulk of concrete consists of cement to be transported; the balance, gravel or crushed rock and sand, ought to be obtainable at any mine without any further expense than gathering it up

on the spot. Attention is called to the advantage of designing these light bridges or trestles so that the whole structure forms a jointless, continuous, trussed girder, and with a view to making them self-supporting in the event of one or more of the legs being washed out from under by floods. It is only necessary to reinforce those parts subject to stresses of tension and shearing, the thin material usually employed for reinforcement being of little or no help against compression. To sustain the ordinary mine track using a car moved by man power, supports 16 feet apart, and chords 6 inches by 8 inches, are ample. Forms for this class of small repetition work are most conveniently made of No. 16 sheet iron nailed to a framework of 2 by 4 scantlings.

## Riviere de Loup Goldfields—Townships of Jersey and Liniere, Beauce County, Quebec.

Notes and Extracts from a Special Report by Dr. Henry Youle Hind, M.A., F.R.G.S., Published in the Year 1864.

Written for the Canadian Mining Journal.

(Continued from Page 619.)

(c) **The boulders in the bed** of the du Loup are principally upper Silurian clay slates of local origin. Occasionally slatey and quartz-like conglomerates are met with, as well as fragments of serpentinite. Both of these conglomerates, which belong to the Quebec group, were observed on place twenty-four miles north of the spot where the boulders were seen in the bed of the du Loup. A few boulders of syenite gneiss and epidosite were also recognized associated with those already described. These facts show that drift, not only from the Quebec group of rocks, which is known to be auriferous, has come from the north, and been distributed over the valley of the du Loup, but also boulders from the Laurentian series which lies to the north of the River St. Lawrence, distant some sixty miles in an air line. Fragments and rough masses of quartz, probably derived from the Quebec groups are also numerous in the bed of the stream. The importance of this supposition will appear when the source of the gold in the valley of the Riviere du Loup is discussed.

(d) **The Drift, Clays, Gravels, and Sands** of the valley of the du Loup and its tributaries may be classified as glacial drift and the remodelled drift. The alluvial flats in the river banks are derived from these older deposits and the wearing away of the rocks in the beds of the streams.

The glacial drift is represented by the unstratified blue clay with its associated boulders of northern origin. This drift must not be confounded with the stratified blue clay occasionally found in the bed on the alluvial banks of the Riviere du Loup. The glacial drift is capped by beds of gravel, gravelly clay, and stratified sand, which constitute the remodelled drift. Fine and coarse sand beautifully stratified was found forming mounds on the east side of the Riviere du Loup one hundred and fifty feet above its present level. The average thickness of the drift probably does not exceed

fifteen or twenty feet, however these different drift deposits may have been produced, it is enough for present purposes to know that both contain materials not only of local origin but also a considerable proportion of foreign detritus of northern origin; susceptible of being identified with rocks in position lying from 24 to 60 or 70 miles north of the area where they are now found.

### 111. The Gold of the Riviere du Loup and its Tributaries.

In this section Dr. Hind gives the results of numerous panning and cradling experiments conducted to determine "the auriferous, or non-auriferous, character of the rocks in position, as well as of the overlying drift." Good colours, occasional nuggets, and flakes resulted from many of the pannings, especially on the du Loup.

In Section IV., Dr. Hind attempts a rough estimate of the value of the drift and concludes that the plateau of the du Loup, containing about 3 grains of gold to each bushel of earth, could be worked hydraulically with profit. Dr. Hind's basis of calculation is a citation from the 1863 geology of Canada. He quotes Mr. W. P. Blake who, in a report on the gold fields of Georgia states that earth containing one twenty-fifth of a grain of gold to the bushel can be worked profitably by the hydraulic method. As the du Loup ground was estimated to contain 3 grains to the bushel, there appeared to be an ample margin of profit. Dr. Hind's estimate thus works out at about \$2.50 per cubic yard.

In Section V., "Origin of the Gold," Dr. Hind discusses further the source of the metal. He concludes that the auriferous drift clays and gravels of the Riviere du Loup really enclose the products of two distinct series of gold-bearing rocks, the upper Silurian slates and the lower Silurian schists, represented on the



Chaudiere, north of a few miles above the Guillaume River, in the parish of St. Franeis, by the Quebec group.

**The Black Sand**, Section VI., exists in considerable quantity in the gravels, clays, and alluvial deposits. According to Dr. Sterry Hunt, who examined this material at different times, it is made up of magnetite, hematite, chromic iron and ilmenite, with occasional grains of garnet nitile and, more rarely, zircon and corundum. Portions of native platinum and iridosmine were also obtained. Dr. Hunt recommends that the black should be saved for further treatment for gold not recoverable by washing.

Five specific advantages in working the gold-yielding Riviere du Loup tract are enumerated in Dr. Hind's Conclusion, Section VII.:

1. Uniform distribution of the gold in the drift clays and gravels in the valleys and in the uplands.

2. The occurrence of rapid streams with abundance of water for sluicing, fluming, or power, throughout the entire area under review.

3. The existence of numerous gold-bearing quartz veins, which can be worked during the entire year.

4. The comparative shallowness of the drift on the uplands which will admit of the clay slates being easily reached, where the course of heavy gold will most probably be found in the fissures of the slates exposed.

5. The facility with which the Metgermette, the small streams flowing into the Riviere du Loup, and the du Loup itself, can be diverted from their channels, and the present beds of these rivers exposed and worked. The beds of these rivers may be regarded as sluices on a gigantic scale which have been engaged in the operation of separating the gold from the drift for ages, and which have treasured up the products of their labour in the beds where they now flow, the gold being caught by the numerous reefs of slates which stretch across the river and thus protected from attrition.

## NOTES ON GOLD DISCOVERIES IN WHITNEY AND TISDALE TOWNSHIPS.

Report by Inspector James M. Bartlett, 15th October, 1909.

Whitney and Tisdale townships are reached from the T. & N. O. Ry., by leaving the train at mileage 228 1-2 which point has been made a flag-station, and named "Red Pine Lakes." The canoe-route from here to Porcupine Lake, which is situated conveniently to the gold-bearing area, is estimated to be in the neighbourhood of sixty miles in length, and is for the most part easy travelling. A fifty chain portage leads from the railway to a small lake from the south end of which a crooked creek drains into the Frederiek House River. The latter stream is ascended through the lake of the same name to Night-Hawk Lake, and the remainder of the journey is via Porcupine River to Porcupine Lake. Two portages—one of three chains and one of eight chains—occur on the Porcupine.

Eight days were spent in this vicinity and the twenty-four square miles bounded by the line shown on the map were travelled over and all the reported discoveries of gold visited. The location of these is shown on the map by the letter "G."

The area to the north and west of Porcupine Lake is a low-lying one consisting of a level plain, largely swamp-covered, with occasional outcrops of rock. The latter seldom rise to a height of more than ten or twenty

feet—as a rule being only four or five feet above the surrounding plain. The rocks of this area strike in a north-easterly direction and commonly weather with what might be described as a saw-tooth effect caused by the development of two planes of weakness, the one dipping at a high angle to the northwest and the other at a much lower angle to the southwest. The rocks of this section are much altered and some of the veins occur in a rock which approaches a quartz-schist. Besides this type rocks of a basic and others of a calcareous type occur.

In Concessions 1 and 2, especially towards the more southerly part, the country is higher and more rock is exposed, but only a few cases were seen where the hills rise as high as forty feet. In this section the schistosity is much more marked than in the northern area—ehloritic and hornblende schists being developed. One outcrop was found of a massive rock, which from the development of serpentine would lead one to suspect that it might have originated from an olivine-bearing rock.

The claims on which gold was seen are as follows: N.W.  $\frac{1}{4}$ , S.  $\frac{1}{2}$  Lot 1, Con. 5, Tisdale—Robert Bruce.

This discovery consists of a series of parallel veins of milky quartz, striking S. 83° E., and varying in width from one to eighteen inches. These had been stripped for about twenty-five feet and at one point on the contact of one of the veins with the country rock, gold is visible in grains and in leaf-like forms.

N.E.  $\frac{1}{4}$ , S.  $\frac{1}{2}$  Lot 2, Con. 5, Tisdale—W. H. Reamsbottom.

A few specks of gold are to be seen in two irregular bands of quartz from two to three inches wide and dipping to the south at a low angle (almost horizontal).

S.W.  $\frac{1}{4}$ , S.  $\frac{1}{2}$ , Lot 11, Con. 5, Whitney—A. E. Way (known as the "Bannerman" claim).

A vein of quartz on this property has been stripped at intervals for about three chains; strike east and west. Near the western end of the trenching it is about two feet wide, but about one chain to the east of here it is broken up into five parallel bands from three to twelve inches in width separated by about six inches of country rock. Dip is not determinable. Gold is visible in two places on this vein.

S.W.  $\frac{1}{4}$ , S.  $\frac{1}{2}$  Lot 2, Con. 5, Tisdale—W. H. Davidson.

Gold has been found at several points on a vein striking S. 85° E., with a dip to the south. The rock is much disturbed here and the vein, so far as could be seen with the small amount of stripping, consists of a series of irregular lenses of quartz.

N.W.  $\frac{1}{4}$ , N.  $\frac{1}{2}$  Lot 4, Con. 1, Tisdale—F. C. Remington (locally known as the "Wilson" property).

The largest body of quartz seen in the district occurs on this property associated with a much decomposed green schist. This vein had been found only a few days before, so that no work had been done on it, but it could be traced for at least six chains in a south-westerly direction, and at one point it appeared to be two chains in width.

Gold could be seen at five or six different spots near the northern end of this outcrop and one of these showings was the most attractive in the district. Enough gold not in the leaf form but rather resembling nuggets, was scattered through the quartz in a space of about an inch and a half square to cover a twenty-five cent piece.

The quartz in this vein, as in all the others mentioned above, is of the milky variety and is practically free from sulphides. No sinking has been done on any of



these properties and very little trenching. In view of this any estimates of "ore-in-sight" at the present time are unwarranted.

Since returning from this field another discovery has been reported occurring in the southwestern part of Tisdale Township.

(Signed)

JAMES BARTLETT.

### GOLD AND SILVER PRODUCTION IN CALIFORNIA

The mining interests of the State are wondering why the annual statistics of gold and silver production of California for 1908 have not been made public. Some time since the State Mining Bureau issued figures of production for all other mineral substances, and many requests have since been made to State Mineralogist Aubrey to supply those of the precious metals, but that official, in an interview, stated that the State Mining Bureau never did collect the figures of precious metal production, principally for the reason that the Government, through the United States Mint, was in a better position to obtain the figures than a State institution.

Besides, as the Government annually collected the statistics, it would place an unnecessary expense upon the State. When the statistics were collected by the Mint they were issued to the public, about the first of July of each year for the preceding year.

About three years ago, the Mint turned the work over to the United States Geological Survey, and since that time the Survey has supplied the statistics. It appears, however, that instead of the Survey improving on the system of the U.S. Mint, each year the statistics are longer delayed. Whether this should be charged to incompetency or carelessness is not known.

California is probably more vitally interested in the figures of gold production than any other State excepting Colorado, and the withholding of the statistics from the press of this State is inexplicable. At the same time the delay in furnishing the figures will make them of practically little value when they are given out.

The State Mining Bureau completed its statistics for 1908 in July, for over forty-five different mineral substances; yet it has taken the U.S. Geological Survey over ten months to collect figures on two mineral substances and they are not yet ready for the press, and California suffers from the delay in not being able to show to the world the large output of precious metals of our mines and thus invite the co-operation of capital.

## A Descriptive Sketch of the Geology and Economic Minerals of Canada.

By Dr. G. A. Young.

Published by the Geological Survey Branch, Department of Mines, Ottawa.

This latest publication of the Geological Survey is designed to furnish a readable, and reasonably complete, description of the geology and economic minerals of Canada. So vast a field needs careful approach. It is by no means easy even to draft a workable plan for an undertaking of this kind. But the need is more than apparent. To the great mass of people interested in some phase of mining, the special reports of geologists are either too vague or too abstruse, or both. In any case, the effort to consolidate in one volume the cream of the geologic, mineralogic and physiographic data gathered by the Survey is commendable. It supplies the public with what is wanted in concise form.

Dr. J. A. Young, the compiler of the volume, has adapted broadly the plan followed by the late Dr. J. M. Dawson in his admirable outline of the physical geography and geology of Canada, prepared in 1897, for the Toronto meeting of the British Association for the Advancement of Science. Since that time our knowledge of the geology of Canada has been added to largely. Consequently Dr. Young's basis is wider and better-defined than was Dr. Dawson's.

Director Brock's lucid introduction is followed by a few prefatory and explanatory pages by Dr. Young. Then each of the geologic provinces, enumerated herewith, is dealt with. Political divisions are disregarded, except for reference.

Dr. Young's provinces are as follows:—

1. **The Appalachian Region**, including the portion of Canada east of a line running from Lake Champlain

to the neighbourhood of the city of Quebec and thence down the channel of the St. Lawrence.

2. **The St. Lawrence Lowlands**, including the plain bordering the St. Lawrence River above the city of Quebec and extending through southern Ontario to Lake Huron.

3. **The Laurentian Plateau Region**, including the great U-shaped upland surrounding Hudson Bay.

4. **The Arctic Archipelago**, including the islands of the Arctic Ocean north of Hudson Bay.

5. **The Interior Continental Plain**, including the central belt of plains lying between the western margin of the Laurentian plateau and the Rocky Mountains.

6. **The Cordilleran Region**, including the mountainous region of the western portion of the continent.

To each of these divisions one chapter is assigned. The geology of each is outlined, and the economic mineral occurrences of each are described at more or less length.

A concluding chapter touches on the phenomena of the glacial period. Two maps are appended, a second of the excellent "Minerals" map, and a general geological map of the Dominion.

### Abstract of Director Brock's Introduction.

Mr. R. W. Brock, Director of the Geological Survey, in his introduction disarms critics. "In a brief and general statement," he explains, "concerning so wide a subject, and covering so vast a territory, much that is interesting and important must of necessity be



passed without notice; and the broad generalizations cannot be expected to present with absolute fidelity the actual facts. What has been attempted is to give merely a general idea of the conditions obtaining in the various geological provinces into which the Dominion of Canada is naturally subdivided, together with the more important minerals which are characteristic of, or which have been exploited in, each."

The geological investigation of Canada may be said to have been commenced in 1843, with the organization of the Geological Survey of Canada, under Sir William Logan. The work of Logan and of his assistants, Murray, Hunt, Billings, and others, was summarized in a volume published in 1863, "The Geology of Canada." This deals only with the southern portions of the Provinces of Ontario and Quebec. The work of the Geological Survey embraces now the northern half of the continent of North America. In spite of enormous difficulties, sufficient work has been done to make known Canada's main geological features; to indicate roughly the territories that will be found to be mineral-bearing; to forecast the character of its mineral resources in the different mineral provinces; and to demonstrate that Canada is destined to become one of the great mining countries of the world. Nevertheless, a large part of Canada is yet unexplored.

The amount of mineral-bearing territory still awaiting the prospector is prodigious, the greatest, in fact, that now remains anywhere on the globe.

The tardiness in developing the mineral resources is due probably to Canada's wealth in farming lands. The first settlers, in order to provide food were forced to become farmers. Farming lands were sought after, and were developed by lines of transportation. The lack of transportation facilities in the mineral-bearing areas, and the extent of country in proportion to its population were contributory factors.

In 1886, the mineral production of Canada did not reach \$10,250,000 in value, and was only \$2.23 per capita. In 1908, the production was \$87,000,000, or \$12.57 per capita. The output of the mine is now greater than the combined output of forest and sea, and ranks next to agriculture.

The total production of minerals for the last twenty-three years amounts to \$926,516,579, of which gold represents \$267,700,000.

In the review of the world's production in 1907, Canada ranked first in asbestos and nickel; third in chromite; fourth in silver; seventh in copper; eighth in gold; and tenth in coal.

Mr. Brock notes the geographical distribution of the chief commercially important minerals, and notes the mineral possibilities of the geological provinces.

**The Appalachian Region** is characterized by rock formations that are typically disturbed and thrown into a succession of folds. In Canada, the Appalachian extension is found to possess many of the minerals that have placed some of the eastern States in the foremost rank of mineral and industrial districts of the world.

Comparing Pennsylvania, which is probably the best developed Appalachian State, with Nova Scotia, Mr. Brock points out that whereas Pennsylvania has an annual production of domestic minerals approximately equal to \$9,340 per square mile of territory, or to \$67 per capita, Nova Scotia has an annual production of about \$1,000 per square mile, or \$46.00 per capita. Taking into consideration the more intensive production that follows increase of population, a geological comparison would appear to be fair, and Nova

Scotia would seem to possess proportionately equal mineral resources with the most favoured Appalachian States. The mineral development of New Brunswick is backward. This is partly due to the heavy covering of soil, and to the forested areas. Many important mineral deposits have been found, and a few are being worked to advantage. The south-eastern portion of Quebec—also belonging to the Appalachian area—is a high producer of economic minerals. The main asbestos mines of the world are situated in this area; and important industries are carried on in chrome iron ore, copper and pyrites.

**The Lowlands of the St. Lawrence Valley**, including the southern portion of Ontario, consist mainly of flat-lying Palaeozoic rocks. The mineral products are typically clay, cement, petroleum, natural gas, gypsum, and other non-metallic products.

**The Laurentian Plateau** is described by Mr. Brock as an area of pre-Cambrian rocks, estimated to cover 2,000,000 square miles, or over one-half of Canada, lying north of the Valley of the St. Lawrence, from Newfoundland to beyond Lake of the Woods, and enclosing Hudson Bay like a huge V. Only the southern fringe of this area is known, and of this fringe only a portion prospected. These rocks are remarkable for the variety of useful and valuable minerals they contain. The Michigan copper mines, the Lake Superior iron ranges, the Thunder Bay silver region; the Sudbury copper-nickel deposits; the Cobalt silver areas; the magnetite and mica deposits of eastern Ontario and Quebec fall within this geological province. Mr. Brock refers to the fortuitous manner in which most of the richest mineral districts were discovered, and to the unsuspected possibilities of this great stretch of 2,000,000 square miles.

**The Interior Plain** embraces the greater portions of Manitoba and Saskatchewan which lie outside the pre-Cambrian, and the Province of Alberta. This area is pre-eminently agricultural, but in addition to furnishing a market for the product of the mines, it will have a large output of non-metallic minerals. It is underlain mostly by sedimentary rocks, chiefly of Cretaceous age, containing coal, building stones, clays, and cement materials. Natural gas has been tapped over wide areas and under great pressure, and there is every indication of a large oil field in the northern portion, at least, of Alberta, and some oil has been encountered in the south-west. The tar sands of the Cretaceous, along the Athabaska River will be important sources of asphaltum. The lignites of the eastern plains and the bituminous coals to the west occupy known areas comprising at least an extent of 27,330 square miles. Alluvial gold, clay-ironstone, salt, and gypsum also occur.

**The Cordilleran Belt**, in South America, in Mexico, and in the Western States, is recognized as one of the greatest mining regions in the world. It is noted principally for its wealth of gold, silver, copper, and lead. The Cordilleras stand unparalleled for the continuity, extent, and variety of their mineral resources. In Canada, and in Alaska, this belt maintains its reputation; although in both it is for the greater part unprospected. In Canada its length is 1,300 miles, and its width 400 miles. Pre-eminently a great mining region, its rocks range from the oldest formation to the youngest. Vulcanism and mountain building have repeatedly been active. Although developed along the international boundary line, probably not one-fifth is prospected at all; not one twentieth prospected in detail; and not one area, however small, completely tested.



Fifteen years ago lode mining commenced in British Columbia, the production before this being largely in placer gold and coal. In 1893, the annual production of minerals in British Columbia had a value of about \$3,500,000. It now runs about \$25,000,000. The total production, up to the end of 1907, was about \$300,000,000. The Yukon is credited with over \$125,000,000 in placer gold.

The Cordilleran belt in Canada is rich also in coal of excellent quality, ranging from lignites to anthracite, and conveniently distributed. Only the coal areas in the southern portion of the Province, and a few small areas on the Telkwa and Nass Rivers, and on the Yukon, are known at present. But the estimated quantity of coal in these known fields is enormous. British Columbia's known coal fields, according to Mr. D. B. Dowling's estimate, comprise 1,123 square miles, containing 20 million tons anthracite, 38 billion tons

bituminous, and 314 million tons lignite. The corresponding figures for the Yukon are: 400 square miles, estimated to contain 32 million tons anthracite, 32 million tons bituminous, and 850 million tons lignite.

The prospective resources of the Cordilleran belt in Canada are enormous. Though mostly unprospected, it has already been proved to possess the greatest copper mines; one of the greatest silver-lead mines; and two of the greatest placer camps in Western America—a region noted for its extraordinary mineral wealth.

Perhaps half the rock history of the world is written in the pre-Cambrian, and it is of this portion that most remains to be deciphered. Since the greatest spread of these old rocks occurs in Canada, much of this work will fall to Canadian geologists, and the careful solution of the problems presented will be as valuable to science as to the mining industry.

## CANADIAN AND ENGLISH COMPANY LAW.

On September 1st, the *Financial Times*, of London, published a letter, in which comparison was made between Canadian and English company law. The comparison did not result favourably to Canada.

Mr. J. J. Harpell, who is at present in England, sent the following communication to the *Financial Times* early in October. A copy was also mailed to the Canadian Mining Journal for simultaneous publication.

For clearness' sake we append the original letter that appeared in the *Financial Times*.

We may remark that if our English contemporaries took ordinary pains to ascertain facts concerning Canada, they would have much less to complain of:—

(From the *Financial Times*, Oct. 23, 1909.)

### Canadian Company Law—How It Differs From English Legislation—Some Objectionable Features.

It seems desirable to sound a note of warning to investors in regard to some of these companies, which the lax state of the Canadian company laws permits to be greatly over-capitalized. The Canadian company laws follow the American rather than the English model, being in this respect unlike the Australian and New Zealand Companies Acts, which are framed upon the English Acts from 1862 to the present date.

A Canadian company may be incorporated under a Dominion charter, or by a charter granted by any one of the nine Provinces. Except in certain special circumstances, as in the case of railways, a Provincial charter seems to be just as good as a Dominion one. Charters for new companies are obtained at a ridiculously low cost, from an English standpoint, the scale of fees being similar to that charged by some of the American States, that have the unenviable reputation of being the "domiciles" of many of the questionable undertakings with which the United States is flooded. In the promotion of a Canadian company the laws make no provision for proper disclosure of agreements by which hidden profits may be secured, and in a majority of incorporated companies there seems to be little doubt that the vendors or promoters make enormous undisclosed profits. There is not in Canada such a place as Somerset House, where a shareholder

can satisfy himself about the main features of the company in which he happens to be interested, or a creditor can see a list of shareholders. The shareholder in a Canadian company knows just as much about its affairs as he can gather on the outside, or as the Directors, collectively or individually, choose to tell him.

### Directors' Idea of Duty.

Canadians have not yet come to realize that a company, when it is incorporated, becomes an entity recognized by law as such, just as much as any individual human being. Canadian, like American, directors do not as a rule recognize that they are trustees for the shareholders—not only for the owners of a majority of the share capital, but for every individual shareholder. Hence it follows that a Canadian director usually finds it his duty and to his advantage to administer the company solely in the interest of the person or persons holding the "controlling interest." It is customary for promoters to make presents of shares for a qualification to directors, who are thus in the pay of persons whose interests are frequently antagonistic to a minority of the proprietors after the company has come into operation. A respectable and responsible Englishman to-day will not lightly, or until after due consideration, allow his name to appear on the prospectus of a new company. It is far otherwise in Canada, and it would be easy to mention names of a number of men well known not only in Canada, but also in this country, who figure on the directorates of all sorts of companies, as to the proceedings of which they know little or nothing—and probably care less.

### Share Capital Regarded as "Boodle."

The method adopted in the formation of a Canadian company is simple. The stock or share capital is from the start regarded as so much "water," or "boodle." Take the case of a company incorporated for, say, \$30,000,000, of which \$15,000,000 is in five per cent. gold bonds, "payable principal and interest, in London, Montreal or New York," and the remaining \$15,000,000 in fully-paid shares, the whole amount of capital required to carry out the purposes of the undertaking being not more than \$10,000,000. The first thing to do is



to advertise the company and start selling some of the bonds. Blocks of bonds are hawked round for, perhaps, 60 cents on the dollar of their face value, but the purchaser, or the selling agent, for his services receives a large number of shares by way of a bonus on the sale of the bonds. It is customary, as a Toronto man puts it, in the formation of a company, "to give a good swag of shares to the boys and let them go around gassing it up." There is no doubt that this frequently occurs. It would be very interesting if a return could be prepared showing what actual cash was received in exchange for the issue of their shares by a selected list of, say, two hundred companies of Canadian incorporation. There is no law prohibiting the issue of shares at a discount, and, in fact, nearly all the safeguards that the English laws provide for the safety and security of the investing shareholder are conspicuous by their absence from the Dominion and Provincial legal codes.

#### Loose Administration.

Time and again there has been talk of a revision of the Canadian company laws, with a view to bringing them into closer correspondence with the laws in force in England. Vested interests have probably proved too strong, for the proposed amendment has been shelved every time it has been suggested. Nearly every member of the Dominion Parliament and of the Provincial Legislative Assemblies is a director of one or more companies, which, to some extent, may account for the company laws being allowed to remain in their present lax condition. It is far from being my wish or intention to in any way reflect upon or disparage Canadian business men, but, with some experience of the subject, I have no hesitation in saying that the business methods and commercial morality of Canadians are patterned upon the standard of the United States rather than upon the customs of Great Britain—and in no branch of commercial life is this dissimilarity to the Mother Country so apparent as in the loose administration permitted to, and practised by, directors of companies of Canadian incorporation. From the foregoing criticism, the Canadian banks are exempted, as the banking laws are quite distinct from the company laws and are rigidly enforced by the Dominion Government.

In Canadian mining companies, often formed to work mere prospect holes, and sometimes absolutely unexplored mining leases, the over-capitalization is ludicrous and pitiful. Pitiful, because many ignorant and innocent people are smitten with "mining fever," and rush in, to their undoing. But in the matter of over-capitalization some of the principal industrial undertakings are about as bad as the mining propositions. In particular, some of the numerous electric power companies might be instanced. Their over-capitalization is nothing short of a public calamity. They carry a huge deadweight of watered stock, upon which the consumer has, for all time, to pay enough for his power to earn dividends. Where the shares of such concerns have passed by transfer into the hands of second and third parties, it would be hard on these innocent holders if laws are passed compelling companies to furnish power at a rate that will pay liberal interest only on the actual capital expended, or, if the State should expropriate some of these power concerns on a valuation arrived at in the same way. This aspect of the case is not imaginary, as there is a strong and growing feeling in many parts of Canada that electricity is now so much of a necessity in everyday life that its generation should be controlled by the State, and that its cost should not be enhanced to the consumer by having to pay dividends

on large amounts of watered capital, for which no cash ever found its way into the treasury of the power companies.

#### Canadian Directors and English Companies.

There has been some newspaper talk of late of the advisability of securing Canadian directors for English companies doing business in the Dominion. It looks well on paper, but it would not, in all probability, turn out well in practice. To begin with, a Canadian of any standing would be unlikely to buy into any English company at current prices to secure a qualification and sufficient interest in a company to become a director. He comes to England to sell, and not to buy, shares, as a rule. A carefully selected, and numerically small, Canadian Board of Advice to co-operate with an English Board of Directors is quite another matter and in many cases might be distinctly advantageous, so long as the control of the purse strings is retained in the hands of those who have to find the money in England. As a rule, however, one strong man of the right sort, with a competent knowledge of his work and on the ground, is worth half-a-dozen Canadian Boards of Advice, if he enjoys the entire confidence of his directors and they give him a free hand in everything except the financial policy of the company.

#### An Instructive Story.

As to the names that figure on the directorates of Canadian companies, the following little story is instructive. A heavily capitalized Canadian company has for some years been unloading its shares in the United Kingdom—or rather it should be said that the promoters and their associates have been unloading their shares on British investors. On the Canadian directorate are some of the best-known names in the business and financial world of the Dominion. English newspapers from time to time have made favourable comment on the strength of the Canadian Board. One of the gentlemen mentioned as a director—a very well-known man—a short time ago visited England, and to him went a seeker for information about the Canadian company. "Why do you come to me?" asked the Canadian magnate. "Because you are one of the directors," was the reply. "Am I?" said the Canadian, "well, I suppose the company is all right, but, to tell you the truth, I didn't know I was connected with it. 'They' put me down on it when the concern first came out, but I've never taken any active interest in it. I suppose I've got some stock in it—must see about it when I get back to the other side." It will be noticed that the Canadian magnate said "they" put him on the directorate. By "they" he presumably meant the promoters. "They" did not put him there for nothing, for many English investors regard his name as a tower of strength as a typically successful Canadian. The moral of the whole of the foregoing is that intending British investors in companies of Canadian incorporation—especially of recent incorporation—should make strict inquiry into the original issue of the capital stock of the company—who got it, and what money was paid to the company, not the promoters, for it.

#### Mr. Harpell's Letter.

To the Editor of the Financial Times:

Sir,—In your issue of September 1st, there appeared an article by one of your correspondents entitled "Canadian Company Law," in which much injustice is done



to Canadian people and to many of their laws and institutions. It would be a great mistake to leave your readers under the impression that Canadian Company Law has not been modelled after similar English legislation, because nothing could be further from the truth. The Dominion Companies Act and that of every Canadian Province, with the exception of Ontario, is similar to the company law of England as it was previous to 1901, while the Act of Ontario is almost an exact replica of the English Act of 1901, with one or two very important amendments, the principal one being that the Ontario Act requires that all foreign companies attempting to market their securities in the Province must file information equally complete and exhaustive as is required of companies chartered by the Province. In this respect the Ontario Act does much more to protect its people from fraudulent flotations chartered by foreign countries than does the English Act.

Within the last few days my attention has been drawn to literature that is being circulated in the United Kingdom by a company chartered in United States to float mining claims of the Cobalt district of Canada. This flotation has made no registration at Somerset House, and its promoters seem to be going about their business of unloading their scrip upon the English people without any interference. This is in marked contrast to the manner in which this same company was treated when an attempt was made to dispose of its securities in the Province of Ontario. As soon as its promoters started to circulate their literature in that Province, they were proceeded against, under instructions from the Government, fined the maximum penalty imposed by the Companies Act, and compelled to withdraw their literature.

When your correspondent says that "there is not in Canada such a place as Somerset House, where a shareholder can satisfy himself about the main features of the company in which he happens to be interested," he certainly shows himself to be not very familiar with his subject. In the Provincial Secretary's Department at Toronto he will get as much information concerning any company chartered either by the Province of Ontario, or which, chartered elsewhere, attempts to sell its stock or bonds in Ontario, as he will get at Somerset House concerning any company registered there. Furthermore, neglect on the part of any company to register the required information is a much more serious oversight in Ontario than it seems to be in England. During the last few years very many promotions of a questionable character have been brought to grief for neglecting to register in the Provincial Secretary's Department the information required by the Ontario Companies Act.

The observation of your correspondent that the over-capitalization of the numerous Canadian electrical power companies is "nothing short of a public calamity" is well made. "The huge dead weight of watered stock" upon which dividends are to be earned is a heavy burden on the industries that are compelled to use their power. But this is not true only of electrical power. Almost every conceivable commodity in Canada is being syndicated and capitalized to an extent that is forcing up the cost of living and production to a point where the prosperity and development of the country are being threatened. The people are already aroused by this fact, and are taking steps to protect themselves which would never have been contemplated under ordinary conditions.

The recently-adopted policy of the Ontario Government to assist a number of municipalities to procure electrical power at reasonable rates is the direct result of an attempt on the part of a few reckless promoters

to compel the people to use their power at prices that would enable them to pay handsome dividends on an enormous amount of watered stock. It is very much to be regretted that so many English papers should have seen fit to denounce this move and to attempt to make it difficult for the Province to raise money for this purpose. These papers should have realized that a policy which had the support of a whole people, so nearly approaching unanimity, must have been actuated by an intolerable condition of affairs. The money which the English people, by subscribing to the recent Ontario bond issue, have provided for the carrying out of the power policy of Ontario means much for Canada, and will do more to build up a healthy sentiment than many times the same amount that has been given for the securities of Canadian syndicates and other private corporations has done.

It will be really too bad if English investors, who have taken up the securities of private Canadian corporations, suffer any loss by the policy of municipalization and nationalization of necessities, which the people of Canada are being forced to adopt. But surely if such should be the case, less blame attaches to the people of Canada than to the judgment of the investors or to English laws, which should have compelled promoters to file particulars of these private corporations at Somerset House, where it would have been seen that the actual investment of these companies represented but a very small fraction of the capitalization, and that the methods of the promoters were, to use your correspondent's words, "to give a good swag of shares to the boys and let them go around gassing it up."

It is very interesting to review some of the tactics by which promoters of these private corporations endeavour to unload their securities in this country and in Canada. In England the people are urged to take up the securities because they represent a Canadian enterprise and by so doing they will be building up the Empire. In Canada the Englishman's subscription is held up as an example and pointed to as a guarantee that the flotation is "a good thing."

I am, etc.,

J. J. HARPELL.

#### ROUMANIAN PETROLEUM.

The growth of the petroleum industry of Roumania has been phenomenal. Twelve years ago, 1897, the annual output of crude oil was 110,000 tons. Last year, 1908, the output was 1,147,000 tons. Nearly all of this production has come from old fields, and much good territory remains to be exploited.

Ninety-five per cent. of the present production comes from three districts—Campina-Bustenari, Baicoi-Tzin-tea, and Gura-Oenitza-Moreni. The two former fields were worked for years by means of the old hand-dug wells.

From the Campina-Bustenari zone comes over 60 per cent. of the total output. It is, therefore, the centre of the industry. More than 50 per cent. of the wells drilled in this region were gushers, often producing hundreds of tons per day when first drilled. Much of the district is held by speculators and development thus retarded.

In the Gura-Oenitza-Moreni field there was only one productive borehole in 1904. There are now sixty.

The English Companies Act forbids the distribution as dividends of money earned prior to the actual flotation of a company.



## LIST OF PERMISSIBLE EXPLOSIVES.

Tested Prior to October 1, 1909.

The following list of permissible explosives tested by the United States Geological Survey at Pittsburg, Pa., is hereby published for the benefit of operators, mine owners, mine inspectors, miners, and others interested.

The conditions and test requirements described in Explosives Circular No. 1, issued under date of May 15, 1909, have been followed in all subsequent tests.

Subject to the provisions named below, a permissible explosive is defined as an explosive which is in such condition that the chemical and physical tests do not show any unfavourable results; which has passed gas and dust gallery tests Nos. 1 and 3, as described in Circular No. 1; and of which, in test No. 4, 1½ pounds (680 grams) has been fired into the mixture there described without causing ignition. (Those reported in Explosives Circular No. 1 are marked \*.)

| Brand.                     | Manufacturer.                                         |
|----------------------------|-------------------------------------------------------|
| *Ætna coal powder A.....   | Ætna Powder Co., Chicago, Ill.                        |
| Ætna coal powder AA....    | Do.                                                   |
| *Ætna coal powder B.....   | Do.                                                   |
| Ætna coal powder C.....    | Do.                                                   |
| Bituminite No. 1.....      | Jefferson Pdr. Co., Birmingham, Ala.                  |
| Black Diamond No. 3....    | Illinois Pdr. Mfg. Co., St. Louis, Mo.                |
| Black Diamond No. 4.....   | Do.                                                   |
| *Carbonite No. 1.....      | E. I. Du Pont de Nemours Powder Co., Wilmington, Del. |
| *Carbonite No. 2.....      | Do.                                                   |
| *Carbonite No. 3.....      | Do.                                                   |
| *Carbonite No. 1-L. F..... | Do.                                                   |
| *Carbonite No. 2-L. F..... | Do.                                                   |
| Coalite No. 1.....         | Potts Powder Co., New York City.                      |
| *Coalite No. 2-D.....      | Do.                                                   |
| *Coal special No. 1.....   | Keystone Pdr. Co., Emporium, Pa.                      |
| *Coal special No. 2.....   | Do.                                                   |
| *Collier dynamite No. 2... | Sinnamahoning Powder Mfg. Co., Emporium, Pa.          |
| *Collier dynamite No. 4... | Do.                                                   |
| *Collier dynamite No. 5... | Do.                                                   |
| Giant A low-flame dynamite | Giant Pdr. Co. (Con.), Giant, Cal.                    |
| Giant B low-flame dynamite | Do.                                                   |
| Giant C low-flame dynamite | Do.                                                   |
| *Masurite M. L. F.....     | Masurite Explosives Co., Sharon, Pa.                  |
| *Meteor dynamite .....     | E. I. Du Pont de Nemours Powder Co., Wilmington, Del. |
| *Mine-ite A .....          | Barton Powder Co., Pittsburg, Pa.                     |
| Mine-ite B .....           | Do.                                                   |
| *Monobel .....             | E. I. Du Pont de Nemours Powder Co., Wilmington, Del. |
| Tunnelite No. 5.....       | G. R. McAbee Powder and Oil Co., Pittsburg, Pa.       |
| Tunnelite No. 6.....       | Do.                                                   |
| Tunnelite No. 7.....       | Do.                                                   |
| Tunnelite No. 8.....       | Do.                                                   |

by other explosives will be made public immediately after the completion of the tests.

With a view to the wise use of these explosives it may be well in this connection to point out again certain differences between the permissible explosives as a class and the black powders now so generally used in coal mining, as follows:—

(a) With equal quantities of each, the flame of the black powder is more than three times as long and has a duration three thousand to more than four thousand times that of one of the permissible explosives; the rate of explosion also is slower.

(b) The permissible explosives are one and one-fourth to one and three-fourths times as strong, and are said, if properly used, to do twice the work of black powder in bringing down coal; hence only half the quantity need be used.

(c) With 1 pound of a permissible explosive or 2 pounds of black powder, the quantity of noxious gases given off from a shot averages approximately the same,

provided:

1. That the explosive is in all respects similar to sample submitted by the manufacturer for test.
2. That No. 6 detonators, preferably No. 6 electric detonators (double strength), are used of not less strength than 1 gram charge, consisting by weight of 4 parts of mercury fulminate and 10 parts of potassium chlorate (or its equivalent), except for the explosive "Masurite M. L. F.," for which the detonator shall be of not less strength than 1½ grams charge.
3. That the explosive, if frozen, shall be thoroughly thawed in a safe and suitable manner before use.
4. That the amount used in practice does not exceed 1½ pounds (680 grams), properly tamped.

The above partial list includes all the permissible explosives that have passed these tests prior to October 1, 1909. The announcement of the passing of like tests

the quantity from the black powder being less than from some of the permissible explosives and slightly greater than from others. The time elapsing after firing before the miner returns to the working face or fires another shot should not be less for permissible explosives than for black powder.

The use of permissible explosives should be considered as supplemental to and not as a substitute for other safety precautions in mines where gas or inflammable coal dust is present under conditions indicating danger. As stated above, they should be used with strong detonators, and the charge used in practice should not exceed 1½ pounds and in many cases need not exceed 1 pound.

JOSEPH A. HOLMES,

Expert in Charge Technologic Branch.

Approved, October 11, 1909.

## WINNIPEG MEETING OF BRITISH ASSOCIATION.

[EDITOR'S NOTE.—The following paragraphs were omitted from Mr. C. W. Knight's article in our last issue.]

The excursion and side trips taken by the party were many and varied. They visited the silver and nickel camps of Ontario, the Keewatin iron ranges at Temagami and Moose Mountain, and Silver Islet, that lone dot of land on the north shore of Lake Superior. While at Winnipeg trips were arranged to the quarries at Stoney Mountain, to modern flour mills and great railway yards, to prairie lands nearby where thrashing operations could be seen on a large scale, and, finally, a trip to the Pacific Coast, which was participated in by the officers and guests of the association.

The excursion to Cobalt and Sudbury was taken before the meeting at Winnipeg by about a score of members. The trip was arranged by Dr. W. G. Miller, and the party was conducted about Cobalt by Dr. Miller and Mr. Arthur A. Cole; while at Sudbury Mr. Turner, the president of the Canadian Copper Company, took charge of the visitors. The geology of Cobalt was explained by Dr. Miller in such a way that it seemed simplicity itself, and the wonder was that the Cobalt area should have remained so long a geological terra incognita. We were told that the oldest rocks in the camp were greenstones known as the Keewatin series; that these were penetrated by granites, now defined as Laurentian. For an enormous length of time these greenstones and granites were cut down and eroded by atmospheric agencies, and during this period the conglomerates, slates, and quartzites were deposited. After another long interval of time all the rocks previously mentioned were cut by great sheets or sills of diabase. As a remnant of one of these sills we were shown Diabase Mountain, to which, surely, every Cobalt mining promoter should daily take off his hat and make his very deepest bow, for has not this same diabase brought up from the depths of mother earth the silver and cobalt and nickel and given to the world a mining camp which is unique on a whole continent?

The widely advertised Lawson vein was studied with interest by the party because there has been little or no work done on the surface and a good idea was therefore obtained of the cracks in which the veins occur. By the genial Sam Cohen the party was shown through the underground workings of the Crown Reserve mine. Some of the methods of concentrating the ores were seen in operation at the Coniagas and other mills. One day was spent in a gasoline launch on Lake Temiskaming and different points of geological note were visited.

Much admired was the model by Arthur A. Cole, of Cobalt, constructed from the geological maps and reports of the area by Willet G. Miller, Provincial Geologist.

Cobalt was left behind early in the afternoon of August 19th, but a few hours were spent at Temagami to see the banded jasper iron ores there. If it is true that the world's known supply of high-grade iron ore may be exhausted in sixty years, these low-grade ores are destined to play an important part in the future of the iron industry.

While in the Sudbury district Mr. Turner personally conducted the members through the large metallurgical plant at Copper Cliff, and although during this process they were more or less choked by sulphur fumes this was soon forgotten over the delightful little luncheon given through his kindness. The same day the Creigh-

ton mine was visited, from which much of the nickel ore is obtained.

The geology of the district was explained by Prof. Coleman. He stated that, unlike Cobalt, no basement had as yet been found for the great series of sediments occurring there. At all places where they are in contact with igneous rocks the contact is an intrusive one. It has not been possible either, to prove the presence of the Keewatin series, though certain greenstones may represent this group.

A day was spent at the Moose Mountain iron mine, which lies to the north of the Sudbury district. Mr. Jordan, the manager, showed the party the various workings, and incidentally pointed out a pine tree which was climbed by a noted iron man from the United States. He was driven to this stern though rather ludicrous extremity—so the story goes—by a bull moose and to prove the truth of this yarn a photograph of the tree was shown.

## GAS-PRODUCER PROBLEMS.

The United States Geological Survey, through its Technologic branch, has just issued a bulletin entitled "Incidental Problems in Gas-Producer Tests," by R. D. Fernald, C. D. Smith, J. K. Clement and R. A. Grinnell. The Survey is studying the general problems involved in the economic use of fuels in gas-producers as part of its investigation of methods of increasing the efficiency of the fuel resources of the country. The bulletin declares that one of the important problems is the determination, under practically constant conditions, of the duration of gas-producer tests necessary to reduce the possible error to a minimum. A greater part of the bulletin is therefore taken up with a discussion of the proper length of test period.

Mr. Fernald, the consulting engineer in charge of these tests, has the following to say on this subject: "Some of the test results reported by certain gas-producer manufacturers are so absurd that no careful purchaser will be deceived; but, unfortunately, the alluring guarantees and special inducements regarding the cost of the installation have caught enough unwary buyers to injure seriously the business of reputable concern. It is not uncommon to pick up advertising material that states a fuel consumption per horsepower per hour based on tests of two or three hours' duration only, which the total coal charged during that period was from 20 to 30 pounds. The producers in such tests are of course of small sizes, but the principle is the same for all.

"The initial fuel bed built up before the test started amounts to several times the quantity of fuel charged during short interval tests, and the amount of gas that may be drawn from this foundation bed is an unknown quantity. It may be very small or may reach a large percentage of the total gas used during short tests, depending on the carelessness or cleverness of the superintendent of the test.

"Of course the claim is made that at the end of the test the fuel bed is always brought to the same condition that it was in the beginning, but experience in this direction need not be great to show that such conditions are practically impossible in tests of short duration. The error introduced by such an assumption may be sufficiently great to make the record results absurd. In fact the percentage of possible error, may be so large that it is only necessary to predetermine the desired fuel consumption per horse-power per hour and trust to it.



lever manipulation of the operator to secure that result.

"It is no wonder then that tests showing a consumption of only 0.6 pound of coal per horse power per hour are often reported; and apparently it is only necessary for some daring promoter to decide that a horsepower should be developed with a consumption of 0.25 pound per hour for tests to be reported that show this figure.

"For accurate tests of gas producers and for a true determination of the fuel consumption, either the condition of the fuel bed at the beginning and at the end of the test must be positively known, or the test must be of sufficient duration to practically eliminate the uncertainties that arise from varying conditions of the bed. Inasmuch as the first method is usually out of the question, it is necessary to resort to the second, at the same time securing as uniform conditions as possible in the fuel bed."

Mr. Fernald summarizes the tests as follows:

"That throughout a test the fuel bed should be maintained in uniform condition, with regard to both the character of the fire and the thickness of bed; but that failing in this, special care should be exercised to see that the fuel bed is in the same condition and of the same thickness at the close of a complete test, or at the end of a test period, as at the beginning; that a test should never be started when the producer has been standing idle for some time with 'banked fires,' as the fuel bed will not be in the average condition under which it will be required to work during the test; that, as the appointed hour for closing the test approaches, the fuel bed is not in proper condition, the time of closing the test should be postponed until the bed naturally assumes the proper thickness and character. No forcing of conditions should be allowed simply to bring the test to an end at a previously determined hour."

## TUNGSTEN.

One of the most widely known of the rarer metals is tungsten. The production of this metal in the United States, however, is not large, as a little of it goes a long way for some of its most important uses. As by far the largest of the tungsten produced is used in making tool steel, the demand for tungsten decreased greatly during the recent depression in the steel industry. In 1908 the domestic production of tungsten ore, reduced to an equivalent of ore carrying 60 per cent. of tungstic trioxide ( $WO_3$ ), the ordinary commercial basis is the United States, was 671 short tons, valued at \$229,955, as against 1,640 tons, valued at \$890,048, in 1907. The statistics at present available from foreign countries show a similar decline. These figures are taken from a report by A. L. Hess, of the United States Geological Survey, published in an advance chapter from "Mineral resources of the United States, calendar year 1908." Mr. Hess gives also details of the industry by States, notes on the occurrence and uses of tungsten, and a partial bibliography.

### Occurrence of Tungsten.

Tungsten is of wide occurrence, but the individual deposits can hardly be said to be large. As a rule they are "pockety"—that is, they occur in lenticular masses or small shoots. Many of those at the surface are quick and easily mined, but it may then take all the profits derived from the first ore body to locate another one.

The tungsten minerals used as ores are hubnerite, a tungstate of manganese; wolframite, a tungstate of manganese and iron; ferberite, a tungstate of iron; and scheelite, a tungstate of calcium. They generally occur in veins cutting igneous rocks that contain much silica, such as granite and granodiorite. Some simple tests for identifying these minerals are described by Mr. Hess.

### Uses of Tungsten.

The most important use of tungsten is as an alloy for tool steel, to which it imparts the property of holding temper at a much higher temperature than high-carbon steels. When lathe tools are made of tungsten steel the lathe may be speeded up until the chips leaving the tool are so hot that they turn blue. It is said that about five times as much work can be done by a lathe built for such speeds and work and fitted with tungsten-steel tools as can be done by the same lathe with carbon-steel tools. From 16 to 20 per cent. of tungsten is ordinarily used in lathe tools.

There has been a widespread belief that most of the tungsten mined went into armor plate, but it is stated by the Ordnance Bureau of the Navy Department that tungsten is not now and, so far as known to that bureau, never has been used in the manufacture of armor plate in this country, and it is not known to have been so used in other countries, though it has probably been used in experimental armor plates. One of the most essential properties of armor plate is its ability to resist shock, and this property is not imparted to steel by tungsten.

As the melting point of tungsten is very high—about  $3,080^{\circ}C$ .—the metal is valuable for use as a filament in incandescent electric lamps, and such lamps are rapidly coming into common use. The whiteness of the light given by the tungsten filament makes it much superior to that of carbon and the efficiency of the tungsten lamp is more than twice as great as that of the carbon lamp. Thousands of filaments can be made from a pound of tungsten.

Tungsten salts are used in fireproofing cloth for curtains, draperies, etc.; in weighting silks; in glass making; as a mordant in dyeing; and for other purposes.

A copy of Mr. Hess's report may be had by applying to the Director, U.S. Geological Survey, Washington, D. C.

## CANADIAN PATENTS.

The following is a list of Canadian Patents, issued by the Canadian Patent Office on Oct. 26, 1909, relating to Mining and Metallurgy and furnished by Fetherstonhaugh & Co., 5 Elgin St., Ottawa, Can. Russel S. Smart, Resident:

121474. N. Langlet, Gothenburg, Sweden. Pros. for precipitating ulmic compounds from the black liquors of soda pulp mills.

121487. W. McCarty, Rocky Ridge, Md. Metallurgical furnaces.

121494. J. H. Reid, Newark, N.J. Pros. for hardening metallic surfaces.

121514. J. E. Teeple, Montclair, N.J. Retorts.

121554. V. Raisin, Paris, France. Pros. of recovering sulphurous acid assigned.

121564. G. L. Meaker, Chicago, Ill. App. for electroplating. Meaker Co.

121574. A. Messerschmitt, Frankfort, Ger. Pros. of producing hydrogen assigned.



## WHAT IS AN ORE?

By J. F. Kemp, D.Sc., Dept. of Geology, Columbia University, N.Y.

(Annual Meeting, Canadian Mining Institute,  
Montreal, March, 1909.)

The definition of a perfectly familiar word sometimes involves unexpected difficulties when we are confronted with the necessity of its expression in unmistakable language. The more familiar the object noted by it, the greater is the surprise of one who finds himself obliged both to delimit from everything else and to put into other words the essential characters. Nothing is more familiar to the mining fraternity than the word "ore." So familiar is it that not every writer of a book on a mining subject has even thought of its definition, having obviously taken for granted the fact that everybody knows what ore is. There are nevertheless some striking differences to be found in the published works, and it may not be without interest to set the matter before the Canadian Institute and see what the impressions of its members are upon the subject.

The variation in conceptions of ore largely rests upon the double use of the word both in a purely scientific and in a technical sense. Sometimes this contrast is not fully appreciated. It will doubtless be admitted by all that there is a group of metalliferous minerals which have been the source of the metals in mining and which as a class may, therefore, be set aside as ores. Thus if I have in my hand an ounce fragment of specular hematite, I may properly say it is an ore of iron. It is a well-known and important member of the group of minerals which have furnished iron to commerce. But if I show you a supposed mining property with only an ounce of specular hematite in it, and in this connection refer to it as ore, you would laugh scornfully. We must, therefore, carefully discriminate in our minds the connection in which the word is used. To this technical use I will shortly pass, since it is the main point of interest, but I wish to clear away a few other preliminaries, relating to the use of the word ore in other senses.

In the microscopic study of rocks we have learned that minerals crystallize from a molten magma in a fairly definite succession and that the earliest group embraces magnetite, ilmenite, specular hematite, pyrrhotite, and one or two rarer metallic minerals, besides several non-metallies, such as apatite and titanite. We often call all these taken collectively as the group of the "ores," as contrasted with the ferromagnesian minerals; with the feldspars and feldspathoids; and with quartz. But we may set aside this use as not bearing in an important manner upon the question.

It is a time-honoured conception of an ore, that it should consist of a metal in composition with some non-metallic substance, such as oxygen or sulphur, which disguises its metallic qualities and which is called a "mineralizer." Native metals are not ores according to this view. The copper of Lake Superior is therefore obtained from "copper-rock," not from ore. Gold is yielded by "gold-quartz," not by gold ore. But I think we must all feel that this old-time usage is no longer sharply observed and that it may well enough drop out. Thus in Mr. T. A. Rickard's interesting little book on "The Copper Mines of Lake Superior,"

we certainly find the output of mines referred to a "ore."

Sometimes also in the mining of the non-metallic substance sulphur, the output of the mine is called "sulphur-ore," although no metal is involved at all. Yet while we may not especially controvert this usage it cannot be said to seriously affect the general and large conception of ore as limited to the metalliferous minerals.

Finally, the word "ore" is used by Milton and other early English writers as meaning a metal itself, artificially produced, but of course this use is obsolete.

Let us now set in order the definitions which have been proposed and which treat of ore in its technical sense. We may then examine them somewhat critically and determine whether they satisfactorily formulate our present conceptions.

The most inclusive and sweeping of the definitions which the writer has found is one given by Dr. R. W. Raymond, on "A Glossary of Mining and Metallurgical Terms," in Vol. IX, p. 160, of the Transactions of the American Institute of Mining Engineers, 1881.

"Ore, 1. A natural mineral compound, of the elements of which one at least is a metal. The term is applied more loosely to all metalliferous rock, though it contains the metals in a free state, and occasionally to the compounds of non-metallic substances, a sulphur ore. 2. Corn. (Cornish) copper ore; tin or being spoken of in Cornwall as tin."

Obviously the above definition is open to grave objection. Thus any mineral which contains a metal as one of its elements without regard to amount would be included. Hornblende with five per cent. iron would be an ore. Some other mineral with a half of one per cent of iron or manganese would equally come within its provisions. To be at all satisfactory we must delimit far more sharply and upon some other basis. Yet from the associations in which the definition appears, one would anticipate a technical rather than a purely scientific expression.

Wm. Humble, an English writer in a "Dictionary of Geology and Mineralogy, etc.," 3d. ed., 1860, gives the following:—

"Ore (erz. Germ.) A metallic compound. Metals are found usually combined with other substances; the compounds they thus form are called ores when the metal exists in them in sufficient quantities to form a considerable portion of the mass."

This definition introduces the idea of quantity, but not as yet in an altogether satisfactory way, the adjective "considerable" not being very definite. At what point do percentages pass from considerable to inconsiderable? Is not 20 per cent. of iron considerable, yet it would not warrant mining. Is 1-1200 of one per cent considerable, and yet it might justify mining for gold? The word "metallic" being sharply used in mineralogy for a variety of lustre, is also objectionable. We might question whether calamine, cerussite, siderite, and many other well-known ores would be included in the definition. Metalliferous is of course better.



Let us take now the two dictionaries which twenty years ago were chiefly cited in English-speaking North America. Worcester (1905 ed.) states: "Ore 1. A mineral body which is reduced to the metallic state by fire; a metal chemically combined with some mineralizing substance which completely disguises its usually recognized and useful properties."

The first sentence of the definition is very objectionable, since wet methods are no less serviceable than fire, in reducing the metals, and this delimitation for ore is obviously ill-chosen. The second sentence brings out the time-honored conception earlier discussed. It is flatly contradicted by Webster whose definition will next be given.

"Ore 1. The native form of a metal whether free or uncombined as gold, copper, etc.; or combined as iron, lead, etc. Usually the ores contain the metals combined with oxygen, sulphur, arsenic, etc. (called mineralizers). 2. (Mining). A native metal or its compound with the rock in which it occurs, after it has been picked over to throw out what is worthless."

The first portion of this definition is so condensed in statement as to be literally meaningless. Thus, as the word native is used in connection with metals, it distinctively means uncombined. How then could the native form of a metal be "combined as (presumably in the case of to be supplied) iron, lead, etc.?" We may infer that native means natural as opposed to artificial; but unless a reader knows more about the meaning of ore than good Noah Webster himself did, this definition will contribute little to clearness of thought. Curiously enough the second definition is scarcely better. Can a native metal be "compounded" with a rock? We usually employ in these senses compound to mean chemical union. Again, is the product of a mine never "ore," until it has been sorted over? Surely the majority of us would impose no such condition.

We come next to a series of definitions in which a distinction is made between the scientific use and the technical use and into which, for the latter, the condition of profit is introduced as a feature, although it is not always insisted on as essential. The late Professor J. D. Dana expresses his views as follows in his *Manual of Mineralogy*, 3d Ed. 1884, pp. 92-93:—

"An ore in the mineralogical sense of the word is a mineral compound in which a metal is a prominent constituent. In the miners' use of the term, it is a mineral substance that yields by metallurgical treatment, a valuable metal, and especially when it profitably yields such a metal. In the former sense, galena, the common ore of lead, is, if it contains a little silver, an argentiferous lead ore; while in the latter, if there is silver enough to make its extraction profitable, it is a silver ore. Further than this, where a native metal, or other valuable metallic mineral, is distributed intimately through the gangue, the mineral and gangue together are often called the ore of the metal it produces. We have beyond to do with ores only in the mineralogical sense.

The Century Dictionary contains a definition, presumably by Professor J. D. Whitney, which is essentially the same:—

"Ore. 1. A metalliferous mineral or rock, especially one which is of sufficient value to be mined. A mixture of a native metal with rock or veinstone is not usually called ore, however, it being understood that

in an ore proper the metal is in a mineralized condition—that is, exists in combination with some mineralizer, as sulphur or oxygen. The ore and veinstone together constitute the mass of the metalliferous deposit, vein or lode. The ore as mined is usually more or less mixed with veinstone and from this it is separated, as completely as may be convenient or possible, by dressing. It then usually goes to the smelter, who, by means of a more or less complicated series of operations, frees it from the worthless material, which still remains mechanically mixed with it, and also sets it free from its chemical combination with the substances by which it is mineralized."

The Standard Dictionary, whose definition presumably passed under the eye of either Professor W. H. Petter or Professor N. S. Shaler, is shaped along the same lines, as follows:—

"Ore. A natural substance, sometimes forming part of a rock, containing one or more metals. The term is applied usually to a mineral from which the metal can be profitably extracted; but is sometimes extended also to non-metalliferous minerals, as sulphur ore."

In these three it is a little uncertain whether, when Dana and Whitney say with regard to profit, "especially," and when the Standard says, "usually," they mean in the technical as contrasted with the scientific use or not. No one of them absolutely prescribes this condition and a reader is somewhat uncertain whether it is essential or not. In definitions it is doubtless better to leave no ground for uncertainty or confusion of thought.

In Prime's translation of von Cotta's "Treatise on Ore Deposits," New York, 1870, p. 1, we find the following: "Under the general term ores are comprehended all minerals and mineral aggregates which from their metallic contents attract the attention of the miner. Metalliferous deposits are therefore for us all local accumulations of minerals or mineral aggregates which correspond to this demand:—

"The idea of the terms ores and metalliferous deposits, in mining parlance, cannot be well expressed in a more precise and scientific manner. There is not any particular class of minerals or of rocks corresponding to these terms. To them belong native metals, metallic oxides, metallic sulphides, and even metallic salts, and their combinations; but on the other hand not all metalliferous species of the Mineral Kingdom, because many of these cannot, either from their nature or the too small percentage of the metal they contain, proportionately to its worth, be worked with profit. No rock, for example, containing 5 per cent. of oxide of iron can be considered an ore; while on the other hand, a vein of quartz, with but 1 per cent. of gold would be regarded as a very rich and valuable metallic deposit, so relative is the idea.

"It is even possible, and has already occurred, that a mineral which for a long time was useless to the miner, and on this account was not considered an ore, has, by means of new discoveries, been included in the category of ores. Blende, for example, when it did not contain valuable metals, could hardly have been considered formerly as an ore, though commonly defined as such; but since a method has been discovered of extracting zinc from it with profit, it may be ranked without doubt among the ores."

(To be continued.)



## Correspondence.

### ELECTROCHEMICAL PLATE AMALGAMATION AND IONIZED GOLD.

To the Editor:—

Sir,—I read with much interest Mr. Carey's learned remarks on the truly wonderful action of electricity when applied to the old and simple process of plate amalgamation. The new adaptation is so simple that one wonders that it has not been thought of before, but so is it with all great inventions.

Mr. Carey himself seems to have overlooked a very simple matter despite his deep scientific study. A very simple matter but one fraught with momentous importance to the whole world and to Ontario in particular. I had not intended publishing this until my financial arrangements were complete, but Mr. Carey's timely article urges me to it. He came very close to it when he spoke of the dynamic quality in the electric flow and of the material ions of Madam Curie. He spoke, too, of the nascent mercury and its wonderful affinity for gold, but he saw only a small part of the glorious truth. He has missed entirely the nascent gold. It is true that the gold he saves is virgin gold and of this, as he truly says, he can save 100 per cent., but there is other gold there—nascent gold! It exists as truly as does the virgin gold, but in its present or nascent form it does not appear as gold. The harsh action of the fire-assay kills it before it is truly born and no sign of it as gold can be found. But by the gentle, kindly but powerful process of ionization, that is by the newly discovered means of controlling the ions of Madam Curie this nascent, this about-to-be-born gold is brought forth in all its beauty as material gold. If Mr. Carey can find me in my laboratory I shall be delighted to show him these ions performing their gynecological functions upon the nascent gold which my delicate and subtle apparatus has proven to exist in large quantities in the Ontario quartz.

It is needless for me to point out to you the greatness of this discovery. I am overwhelmed when I think of it. Think of what it means to Hammond Reef, to Highland Mary, and to all Ontario.

Yours truly,

N. A. Scent.

P.S.—Please do not consider that anything I have said in regard to the nascent gold in Ontario quartz casts any aspersions on the virginal character of Mr. Carey's gold, and please tell me Mr. Carey's address; he writes so beautifully, I want him to write the prospectuses for my forthcoming companies.

Nov. 9, 1909.

Editor Canadian Mining Journal:

Sir,—Mr. Cyril Knight's interesting account of the Winnipeg meeting of the British Association in your last number devotes some space to the Lower Huronian Ice Age, which was briefly described by me in a paper on the Canadian Archaean. The report leaves the impression that the evidence in its favour is by no means convincing. As the Lower Huronian conglomerate is the country rock of nine-tenths of the rich silver veins of Cobalt, it may interest mining men to know something of the evidence for its glacial origin.

Mr. Knight quotes three geologists as throwing doubt on the Lower Huronian Ice Age. All of them are emi-

nent men in their special department, but none of them can be called a glacial geologist, so that their opinions on the subject must be looked on as off-hand rather than carefully studied. President Van Hise's suggestion that somewhere a glaciated basement ought to be found beneath the conglomerate ignores the fact, well known to glacialists, that near the edge of a glaciated area where the thickness of ice is not great the ice sheet often moves for many miles over loose materials without ever reaching the rock surface beneath. This is true of thousands of square miles of glaciated country in certain States to the south of us, and is true also of most of the area covered by carboniferous boulder clay in India. The carefully studied conglomerate area at Cobalt makes up in all only a few square miles. There is a much larger area of Pleistocene boulder clay showing no striated surfaces in the neighbourhood of Toronto. Probably as our knowledge extends a striated floor will somehow be found beneath the Lower Huronian tillite; but its absence in the small area known has no force as an argument against its glacial origin.

The real test of glacial action is to be found in boulder clay and the glaciated stones contained in it. This is the final proof of ice action at any age. To the geologist unfamiliar with ancient tills the Cobalt conglomerate may look very unlike the boulder clay softening under the rain about him, merely because it is a very firm, hard rock; but anyone who has seen an ancient boulder clay such as the South African Dwyka, is impressed by the striking resemblance between the two. If only a small patch or two of the boulder conglomerate was known, Dr. Miller's suggestion of freshet action would be reasonable, but surely no one will claim that freshets have formed the thousands of square miles of boulder conglomerates in northern Canada reaching from Lake Chibougamou to Lake Winnipeg, and often enclosing boulders tons in weight miles away from any known source. Likewise no one will imagine that freshets can produce the beautifully striated stones found in the Lower Huronian boulder clay.

Prof. Hobson's suggestion that the striations might result from other causes glacialists are not likely to accept. No cause, such as faulting or mud flows, has ever been shown to form anything approaching a typically glaciated stone, and the dozen specimens shown at Winnipeg are typical striated stones with markings on several sides, and even with minute "chatter cracks," as Mr. Taylor pointed out to me after examining the collection with a lens.

The impression produced by the specimens and lantern slides on the glacial geologists present in Winnipeg may be shown by the following quotation from *Nature* (Oct. 7, 1900, p. 446):—

"In the subsequent discussion Drs. Fairchild, Strahan, Warren, Upham and Derryhouse expressed the opinion that Prof. Coleman had established his contention." It should be added that Messrs. Leverett and Taylor, who did not speak, are in accord with the others, and that Mr. Tyrrell, after a thorough study of the stones, can explain them only as glacial.

Everyone familiar with Pleistocene geology will agree that the names just given include several of the most competent and experienced glacial geologists in the world.

The evidence for the glacial origin of the Lower Huronian conglomerate presented in three papers published during the last two years has been widely accepted in the Old World as well as in America. For instance, Prof. Haug, of Paris, founds upon my results his discus-



sion of ancient climates in his recent book on geology, one of the most important works on the subject produced of late years.

When every glacialist who has examined the specimens obtained at Cobalt accepts them as glacial, and when doubts as to the value of the evidence are confined to non-glacialists, it looks as though the proofs of a Lower Huronian Ice Age must be fairly satisfactory.

A. P. COLEMAN.

### PERSONAL AND GENERAL.

Major Boyd McGee, General Manager of the Keeley mine, South Lorraine, is not the McGee referred to in press notices of the Russell extradition proceedings.

The Hon. Robert Rogers, Provincial Treasurer of Manitoba, was in Montreal recently. Mr. Rogers is one of the directors of Black Lake Consolidated Asbestos.

The Montreal office of the Robb Engineering Co., Limited, Amherst, N.S., has been moved to 607

Canadian Express Building, Montreal. Mr. R. W. Robb is manager.

Messrs. Pellew-Harvey and Fell, mining engineers and metallurgists, of 62 London-wall, E.C., state that the partnership hitherto existing between Mr. E. Nelson Fell and Mr. W. Pellew-Harvey has been dissolved by mutual consent as from the 1st inst. Mr. Fell retires from the firm and the business will be carried on as heretofore by Mr. W. Pellew-Harvey in the name of Pellew-Harvey & Co.

The efficiency of furnaces of various kinds has been investigated by J. W. Hull, a British metallurgist. The greatest efficiency in ordinary work was found in the use of an English blast-furnace making pig-iron, not less than 81.7 per cent. of the heat given by the fuel being utilized, but 65.3 per cent. escaped from the furnace and was recovered outside. A puddling furnace not fitted to a boiler wasted 91 per cent. of the heat. The most wasteful furnace of all, however, was proven to be the common coke crucible furnace employed in making steel, as this uses only 1.43 per cent. of the heat. 98.57 per cent. being lost.

## SPECIAL CORRESPONDENCE

### NOVA SCOTIA.

Glace Bay, Nov. 4.—The U. M. W. A. Strike.—Repeating the figures given in the last two letters, the output figures of the Dominion Coal Company for the month of October compare as follows with the preceding months of the strike period:—

|                     | Total<br>Output. | Average Daily<br>Output. |
|---------------------|------------------|--------------------------|
| July . . . . .      | 136,000          | 4,200                    |
| August . . . . .    | 154,000          | 5,900                    |
| September . . . . . | 180,000          | 7,200                    |
| October . . . . .   | 205,000          | 8,200                    |

For the last week in the month the output averaged around 8,800, and on one occasion it went over the 9,000 ton mark. How very ineffectual the so-called strike is at the older mines of the company is shown by a comparison of the outputs for the month with those of October last year:—

|                           | Oct., 1908. | Oct. 1909. |
|---------------------------|-------------|------------|
| Dominion No. 1 . . . . .  | 44,063      | 51,076     |
| Dominion No. 2 . . . . .  | 49,769      | 44,522     |
| Dominion No. 3 . . . . .  | 19,443      | 18,726     |
| Caledonia No. 4 . . . . . | 31,156      | 23,874     |
| Reserve No. 5 . . . . .   | 28,531      | 29,896     |

The total output for the month was 205,000 tons, comparing with a total of 265,000 tons last October. Two of the company's mines, namely, Nos. 6 and 7, have not worked since the strike commenced, and if their output is taken into account, the production for the past month was only 29,000 tons below that of last October. It hardly looks as if the U. M. W. A. were correct in their pre-strike statement that they controlled 95 per cent. of the output, or that four thousand miners were on strike. In the face of the foregoing figures the reader may form his own estimate of U. M. W. A. arithmetic. This increase in outputs has not been obtained by any large importation of foreign strike-breakers, for the number of actual foreigners which have

come to Glace Bay since the strike commenced does not exceed one hundred men. At least 80 per cent. of the men who have filled the places of the strikers are residents of Eastern Canada, and probably seventy-five per cent. of these are natives of the Island of Cape Breton. The entirely foreign nature of this strike is now more clearly apparent than ever. It was called to obtain recognition of a foreign union, has been financed entirely by foreign funds; the majority of the strikers are persons born out of Canada, and the two outstanding results of the strike are at present the impoverishment of a Canadian industry, side by side with the enlargement of the United States coal sales in our own country. There are all kinds of side issues connected with this strike, such as loss in wages and hardships which must be borne by the strikers and their families, the breaking up of pleasant relations between the Coal Company and their employees, and many other things all more or less unpleasant, but the two main results are as stated, loss to Canada and gain to the United States. This cannot be gainsaid, and its moral is too obvious to need elaboration.

**Renewal of the "Shortt" Agreement.**—During the latter half of October negotiations were carried on between representatives of the Provincial Workmen's Association and the management of the Dominion Coal Company for a renewal of the award of the Conciliation Board in 1908, and under which the P. W. A. has worked through the trouble caused by the U. M. W. A. agitation. The company offered to renew the agreement in its entirety. This proposal was considered by the lodges, who reported in favour of acceptance, and a meeting of the Grand Council authorized this step. A very large committee of the P. W. A. representing all the lodges met the management of the Coal Company on the 4th of November, and it was finally arranged to sign an agreement continuing the present contract in force until December 31st, 1911. One of the demands of the P. W. A. before the Board of Conciliation in 1908 was a 15 per cent. increase to the able-bodied unskilled labourer, who at that time was rated at \$1.38 per day. The Board awarded an



increase of 10 per cent., making the maximum wage \$1.52 per day, which was the rate offered by the company in Schedule No. 1. This rate has now been raised by the company to \$1.60, being a 5 per cent. increase on the award of the 1908 Board. The terms now accepted by the P. W. A. for a further two years are a very substantial increase on the rates which were paid under the three years' contract signed in 1904.

No better proof of the vitality of the P. W. A. could be asked than the signing of this contract, and it is an open secret that their desire to continue the present arrangement has been crystallized by the extraordinary action of the U. M. W. A. executive in proceeding against the coal operators on a charge of criminal conspiracy to raise the price of coal. The U. M. W. A. campaign has been from the first conducted in a very unintelligent and foolish manner, but nothing it has yet done has been so calculated to lower its prestige and alienate its dupes as this particular ineptitude. One could almost question the sanity of a body of men who first of all ask for a preposterous advance in wages from the management of a coal company which for three years had been losing money, then stop the production of coal by striking, and finish up by prosecuting this company on suspicion of endeavouring to get a reasonable profit on its product. This is exactly what has happened at Springhill. The ultimate object of the lavish expenditure of American money in Nova Scotia is too palpable to deceive any but those who deliberately close their eyes to it, and it is certain that nothing has so thoroughly alarmed the miners of Nova Scotia who think about these things as the action of the U. M. W. A. against Messrs. Dick and Cowans. In the matter of markets and price the interests of the miner and of his employer are identical, and the willingness of the two parties to the two years' contract to renew arises from a realization of the imminent danger in which our coal markets stand from the United States operator and the U. M. W. A., and a grave sense of the common danger which loss of trade most certainly spells to both employees and employers in Nova Scotia.

**Birds of a Feather.**—A little while before the U. M. W. A. strike Glace Bay was favoured by the presence of Kier Hardie, a gentleman whose recent remarks about the melting pot and His Majesty's crown have caused a wholesome revulsion against him and his ilk. For a brief space we had the pleasure of the company of Mr. E. McCullough, an American citizen, who told a Sydney audience that Canada's national ambitions were "tommyrot," and who referred to our soldiers as "pimps." Then we suffered the lueubrations of an aspiring member of the Trades and Labour Congress from Toronto, whose reportorial feats induced the Grand Council of the P. W. A. to refer to him as "a shameless prevaricator." We are to have Hr. Haywood, a person who became notorious in Colorado in connection with the Western Federation of Miners. The last state of this town appears to be worse than at first.

One of the things "which no fellow can understand" is the attitude of the politicians of Canada towards our rapid industrial development. The Government, which happens to be in power at any well-marked stage of our natural expansion, takes credit for that particular evidence of growth, and proudly refers to it as being associated with itself. One often sees in the newspapers and in campaign literature tables showing the expansion of the country's finances, its transport facilities, or exports under such and such a period of Liberal or Conservative rule, and the last-named accident is claimed as the cause of the expansion. This seems to us so much moonshine. Governments come and governments go, as they reflect the mood of the voters, the wealth of the campaigners, or as one party selects a more attractive election issue than the other. There is no essential difference in the aims or the principles of our two leading political parties, and their existence is merely a necessary condition of that form of government by opposition which is a tradition with the Anglo-Saxon. In Nova Scotia, however, we are so unfortunate that one devoted industry has

become the shuttlecock which has to withstand the buffetings of the party battledores.

The Dominion Coal Company was conceived by a Liberal, and was carried through under a Liberal administration. The incorporation of this company was objected to by the other political party only because it was advocated by the party in power. The incorporation of the Dominion Coal Company simply came about because the times were ripe for it, because the genius of one man saw its necessity and its possibilities, and because the coal industry of this island needed some such consolidation of interests to prevent useless expense and waste, and to make progress a certainty. The expectations of those who incorporated the Coal Company have been more than justified, and, as we remarked in a previous letter, the formation of the Dominion Coal Company was the inception of the greatest single impulse ever given to the commercial prosperity of Nova Scotia. But no political party can with fairness take all the credit for this. It would have come, no matter which side held the reins for the nonce.

Nevertheless, the opposition towards the Coal Company has never ceased, and for purely party reasons it has been fostered and kept from dying of sheer inanition. By a peculiar mental process the enmity has spread to the whole coal trade of the province, and certain newspapers never lose an opportunity to villify the coal industry and damage as much as possible all connected with it. It is not necessary to name these papers, for their daily perversions and libels are the bane of every coal man in the province. Plain every-day men might think that matters of common interest could be lifted out of the maelstrom of politics, and surely it is not for the benefit of any business conducted in our midst that it should be unremittently assailed for mere party gain. We have in this province some of the most magnificent collieries in operation. Our mining methods will bear comparison with anything on this continent. Yet one never sees a word of commendation on this score, and the visiting engineer who takes our provincial press seriously must be sorely puzzled at times to reconcile what he reads therein with the actual conditions as they present themselves to him. Surely there is no other place where the newspapers open their columns to anonymous letters criticizing not only the policy of the coal companies, but also the most intimate details of their technical management and the pitmanship of the officials. These are matters for the Mines Inspector and those whose duties fit them to pass upon them. When a newspaper takes upon itself to criticize the management of a colliery it usually falls into laughable and egregious error, which is some consolation, but it seems to us a regrettable thing that it should have become a tradition with a certain section of our provincial press to everlastingly "knock" the coal industry. The outsider who is not acquainted with Nova Scotia's family squabbles may be excused if he acquires a poor opinion of our coal trade generally. Very recently Glace Bay was visited by a gentleman from the High Commissioner's office in London, who expressed surprise at finding such up-to-date machinery and methods, as he phrased it, "tucked away in a little corner of Canada like this." He was unable to understand why the newspapers should refer so slightly to the mines and their management, and we were unable to enlighten him. As the Montreal Gazette recently remarked, "politics have entered into the strike situation in Nova Scotia in a manner that no person outside of Nova Scotia can understand." To understand the attitude of the Nova Scotian party press towards the coal industry is difficult, but to justify it is impossible.

#### ONTARIO.

**Cobalt, Nov. 4.**—During the past summer some of the best finds in the history of the Nipissing Mining Company were made. One of these, which is known as vein No. 114, was found near shaft 26, but when first discovered little work was done,



as it was decided to cover as much territory as possible during the season. A few days ago, however, a force of men started to work stripping the vein, and toward the east the vein widened from one inch to three inches of high-grade ore. About 250 feet of stripping has been done, and shows a rich ore shoot for a distance of 50 feet. During the winter a cross-cut will be started from the 85-ft. level of shaft 26 to cut the vein.

The returns from the last sale of the Gillies Limit lots were so satisfactory to the government, they have now announced a third sale, which will take in about 1,200 acres directly south of the land already sold. It is understood that this new area embraces some very promising territory, and it is probable that considering the discoveries that have lately been made in this section, that the prices will be fairly high. The total area of the Gillies Limit amounts to about 64,000 acres, and of this about 2,100 acres have been offered or sold. The tenders will close on the 15th Nov. Hundreds of prospectors are looking over the territory, and a number of valuable finds have been reported, which will no doubt make prices much higher on this sale than the previous ones. Many of the mining companies have sent out their own men to look over this territory.

The new government road which is being built into Gowganda will undoubtedly have a very important effect on the future of that camp. It is estimated that there is at present in the ore houses of the different mines about ten carloads, which will be shipped as soon as the winter roads are in condition. It is interesting to note that the Reeves-Dobie company has made a contract to ship out their ore at \$15 per ton to Sellwood. The shippers will be the Boyd-Gordon, Reeves-Dobie, Blackburn and the Mann, and it is probable that the Bartlett will send out some.

In sinking the winze for the 150-ft. level of the Coniagas a new vein was encountered just below the contact between the keewatin and the conglomerate, and in the keewatin formation, running at right angles to the vein on which the winze was started. The winze has been continued some distance below the point at which the vein was struck, and the ore in wall rock still carries small values in silver. The winze will be continued to a depth of 75 feet, and from the bottom a crosscut will be run to a point below the shaft, and then a raise will be started to connect up the two workings. All the machinery for the new addition to the mill is now on the ground, and the work of installation will be pushed as rapidly as possible. This company has ore reserves which probably are second to none in the camp, and as their veins are narrow and the wall rock heavily impregnated with silver, the supply of mining ore is very large. The capacity of the mill when completed will be 160 tons a day. The announcement that this company would declare their regular quarterly dividend on Nov. 1st was rather a surprise. In July the directors issued a circular stating that the quarterly dividend due Aug. 1st would not be paid, as the company needed the funds to complete the addition to the mill at Cobalt and the smelter at Thorold, and although it was known that the suspension was only temporary, it was believed that the dividend due Nov. 1st would also be passed.

The work that is being done at the Cobalt Lake has lately been productive of very favourable results, and considerable quantities of high grade ore are being mined. A new ore shoot has been discovered in the vein that was traced along the McKinley-Darragh boundary, and ore carrying up to four thousand ounces of silver is being taken out. The vein that was struck some time ago is still carrying good silver values.

A case that has aroused much interest lately is the claim of Mr. Douglas Balfour in relation to a property in the Miller Lake district, known as M.R. 1098, the defendants being James Hylands, Gardner and Johnson. The claimant Balfour asked to have the mining claim declared invalid, for several

causes, among these being non-performance of the necessary work, it being stated that the thirty days' work to be performed directly after the claim had been staked was not done. In regard to the contention the Mining Recorder stated that the holders of the claim did commit a technical violation of the Forest Reserve regulations, but he considered it unwarrantable to declare the claim invalid. To do so would, he believed, disturb nearly half the mining titles in the forest reserve, as a practice had grown up in the district of doing the necessary work without waiting for the receipt of the formal permission. There has been considerable agitation lately in the outside districts on account of the efforts of various claim-jumpers to acquire properties that they thought would make good, as on account of the peculiar nature of the mining laws it is very difficult for the original stakers to hold their claim without some technical violation of the Mining Act.

Another promising lead has been found on the 100-ft. level of the Silver Leaf. It has been drifted on for some distance and shows about five inches of calcite and smaltite with some values of native silver. Another very good vein was struck at a point about fifty feet from the Crown Reserve line on the 100-ft. level, and it is thought to be an extension of one of the Crown Reserve veins. Where it was encountered it showed a width of about 12 inches of high grade ore. Since mining was started on the Silver Leaf, the ore where found has always been very pockety, but the veins met lately under the Crown Reserve management seem to give promise of greater extent. Under the lease by which the Crown Reserve holds the Silver Leaf, the latter company receives 25 per cent. of the gross value of the ore, on condition that \$20,000 is spent on the property the first year, and \$10,000 annually for the four remaining years.

At the annual meeting of the Little Nipissing Mining Co. held on Oct. 20th, the decision to increase the capitalization of the company from one million to one million and a half dollars was confirmed. The directors also authorized the sale of 250,000 shares of the new stock at twenty cents a share, to be first offered pro rata among the shareholders. The meeting was very stormy and Mr. S. D. Madden and Mr. A. Ferland retired from the directorate.

The Coleman Development Company has decided to start diamond drilling on its properties in Coleman and Lorraine Townships. Considerable prospecting is also being done at the present time. It is estimated that there are now nine diamond drills at work in the Cobalt camp, in addition to these two are operating in South Lorraine, one at Silver Lake and one at Miller Lake. Practically all the companies in camp have at one time or the other resorted to that method of prospecting. Considering the narrow veins that are found in this district it is not to be expected that the same results can be obtained as in any other district, where the ore bodies are much larger, but nevertheless they have been the means of finding many new veins. The most important feature, however, has been the knowledge they have given regarding the different formations, that has encouraged several of the companies to continue their workings at greater depth, when they had thought that they had practically reached the limits of their ore bodies.

The Wyandoh, under the management of Mr. Nesly, will commence active development work at once. The company has decided to install a steam driven compressor and the other necessary equipment, bunk houses and other buildings will be erected as soon as possible.

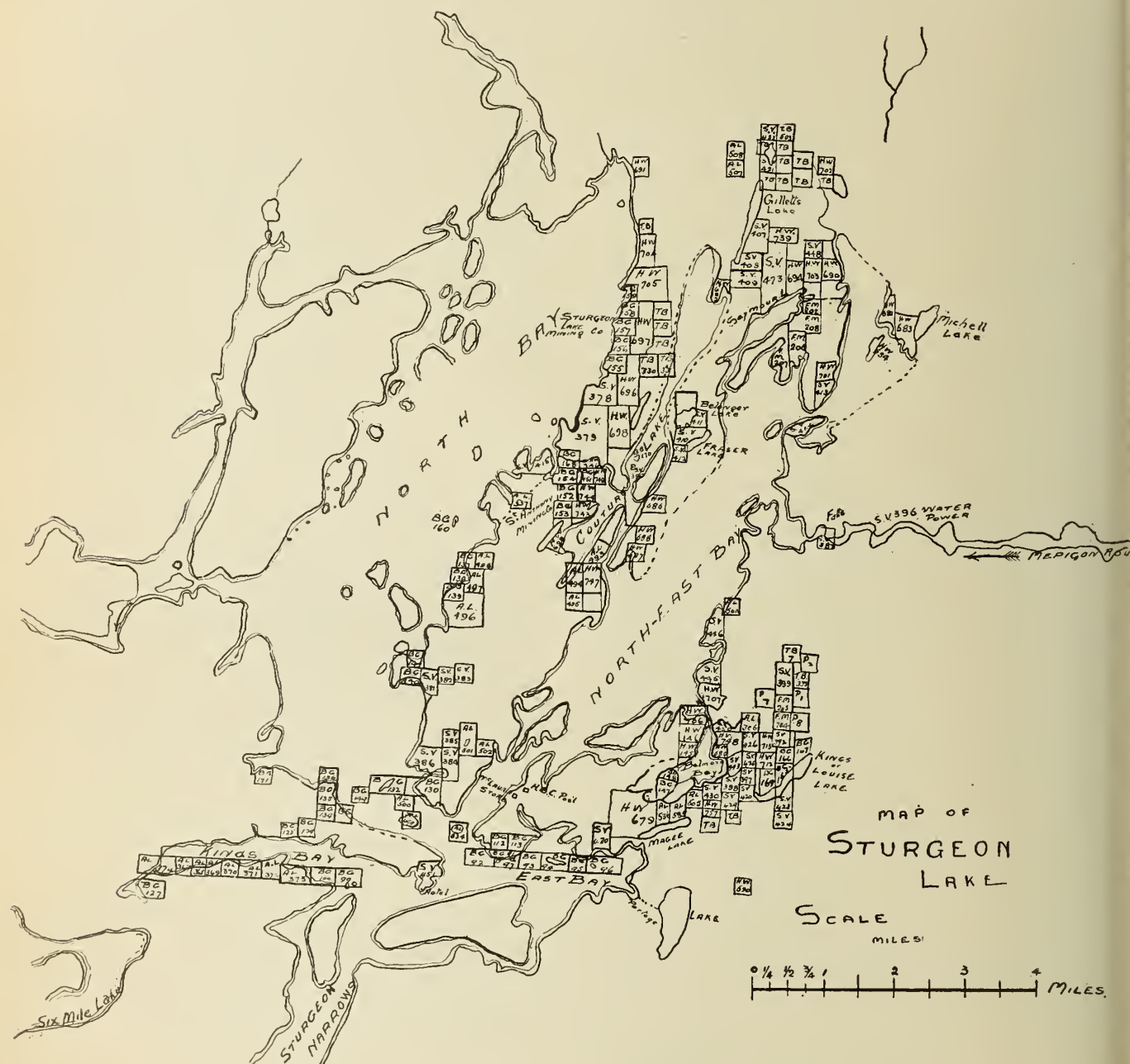
An interesting report has recently been issued by Col. Carson on behalf of the directors of the Crown Reserve, covering the first nine months of 1909. It shows that during this period a total of 84 cars of ore were shipped, and 22 of these were high grade. The total net value of the ore amounted to \$1,368,951, the net profit on operation amounted to \$1,078,806. Of this

amount \$795,966 was paid out in dividends. The surplus on September 30th was \$629,957. On November 1st winzes were started to the 300-ft. level. These will be connected up, and the main shaft also connected at that depth. During this period a total of 3,336 feet of development work was done.

The development of the Wetlauffer mine in South Lorraine has shown that the high grade ore which was found at the 50-ft. level has continued to the 100-ft. level, and at that depth it is fully as rich, and the veins are wider than on the upper level.

tion was met with from the Railway Commission, as at first the refused to permit this work to be carried on on the right of way. The opposition was overcome, however, and work will be started in a short time. It is understood that good indications have been encountered in the diamond drill hole which was bored at this point.

The Right of Way Mines, Ltd. has issued a circular to its shareholders requesting them to forward their certificates to the secretary in order to receive an exchange for the certificates of



The second shipment of high grade ore will be made from the mine this week, and the development of the property is progressing to such an extent that it is believed that regular shipments can now be maintained. This district is commanding much attention on account of the number of important discoveries that have been made there during the past summer, and it is believed that it will develop into one of the best sections outside of Cobalt.

The Station Grounds Mining Co. has decided to sink a shaft on their property near the railway track. Considerable opposi-

tion was met with from the Railway Commission, as at first the refused to permit this work to be carried on on the right of way. The opposition was overcome, however, and work will be started in a short time. It is understood that good indications have been encountered in the diamond drill hole which was bored at this point.

The Cobalt Paymaster Mines, Ltd., which was formerly known as the Amalgamated, has secured the entire holdings of the Cobalt Treasury Co., including practically all the mining rights under Sasaganiga Lake, and 66 feet of the shore line on that portion of the Hudson Bay and Trethewey claims adjoining the lake. The main shaft is down 115 feet, and about 600 feet of drifting has been done at this level, and some cobalt ore



carrying small values in silver has been encountered. A diamond drill has started to work, and holes will be bored underneath the lake, to crosscut veins which have been traced to the lake shore.

An important discovery has been made on the Newman property, which adjoins the Great Northern in South Lorraine. The vein varies in width up to six inches, and carries high values in silver.

The American Smelting and Refining Co. has been served with a writ by the lawyers acting for Messrs. D. M. Steindler and A. M. Jacobs, which prevents them paying \$7,000, the proceeds of a shipment of ore from the Peterson Lake Co. This money has been attached in connection with a suit brought by these gentlemen against the mining company for some \$28,000, which they claim is due them for money advances.

It is understood that an English syndicate, after careful examination of the Trethewey mine, has taken over the balance of the treasury stock, amounting to 54,450 shares, at \$1.50 a share. In conjunction with this announcement it is stated that the next interim dividend will be 15 per cent. This will bring the total dividends for the year up to 25 per cent.

Great interest has lately been displayed in the gold discoveries at Porcupine Lake, which is west of Night Hawk Lake. Many prospectors have already gone into the district, but as the majority of the smaller lakes are now frozen over, many who would otherwise go in, will not be able to do so for some time. Engineers of the Ontario Government have visited this new gold field, and are convinced that at least some of the discoveries made give promise of good results. The discoveries are all of gold in quartz, and in places veins have been traced for several hundred feet. Some of the samples showing free gold are very spectacular, and it is stated that average assays from different veins have run nearly \$200 to the ton. It is probable that this section and the Larder Lake district will be the centres for the prospectors for the coming winter. Several hundred men have already made their way into the Larder Lake district, and this number will probably be largely augmented in the near future.

**Kenora Mining Division.**—A general meeting of the prospectors' and Mine Owners' Association of the Kenora Mining Division, was held in the Town Hall, Kenora, on Tuesday, November 2nd.

A letter was received from J. Edwards Leekie, of Cobalt in answer to a request from the Association for an expression of opinion as to the fairness to the prospector of the time given him in which to do his first 30 days' work (Mining Act, Ontario, Sec. 78, Sub-Sec. 1, Clause (a)). The opinion voiced by Mr. Leekie was that during the months of June and July it should not be obligatory to do assessment work on account of the very real hardship of trying to work in these months because of the flies and mosquitoes. In his opinion, while a prospector should be permitted to work during these months, if he so desired, it should not be compulsory for him to do so.

The meeting then discussed some needed changes in its own constitution, and finally elected a By-Law Committee to carry on this work.

The subject of applying to the Government to have a geologist come into this district and make a geological survey was then discussed; some members pointing out that the last visit paid to this district by a geologist was a very short one of a few days some 12 years ago, and that the present geological map of the district was incorrect in several particulars.

It was finally agreed to draw up a resolution re Government Geologist and submit it to the next general meeting to be held December 7th.

In order to be of greater use to the prospector coming into this district it has been decided to give an account of the various trails and routes and methods of transportation best

for this district, together with a list giving approximate cost of outfit for prospecting and the places where necessary stores and outfits can be purchased together with such information and advice as may be of use to prospectors new to this neighbourhood and commencing operations here.

#### BRITISH COLUMBIA.

**Rossland.**—The Consolidated Mining & Smelting Co. of Canada, Ltd., at its annual meeting increased the capitalization of the company by two millions of dollars to \$7,500,000. In view of the fact that the company has during the last fiscal year acquired several claims adjoining the St. Eugene mine at Moyie, and has secured control of the Monita, Mugwump and City of Spokane properties at Rossland, adjoining the War Eagle, and as \$24,444.33 has been spent in putting the Richmond-Eureka in working condition, a large sum of money has been expended on the Snowshoe and Phoenix Amalgamated mines in Phoenix; as we say, in view of this heavy expense in work to advance the future interests of the company, this increase of capitalization is looked upon rather favourably here in British Columbia. It is generally known, too, that it will take considerable money to get the Phoenix Amalgamated group in producing form. The amount of money spent in acquiring new mines and real estate was \$77,836 for the year ending June 30th, 1909.

The company earned a net profit during the year under review of \$329,004.08. This figure was arrived at after writing off the usual accounts including \$153,218. depreciation and \$563,413 expended on development work. There was spent in augmenting the working plants at the different mines of the company \$164,951. The figures indicate good progress and if the profits were not exceptionally large the metal market can be blamed to some extent, as the company had to absorb about \$56,000, shrinkage in metal quotations. During the year steady shipments were maintained from the St. Eugene, Centre Star group and the Snowshoe mines, while occasional shipments were made from the Richmond-Eureka and Phoenix-Amalgamated properties. The amount expended for development work, however, speaks for itself; a good supply of ore was kept in sight all the year and no attempt made to force shipments. The shipment from the five groups for the year ending June 30, 1909, amounted to 480,533 tons, valued at \$4,012,587, or an average of about \$8.35 per ton. Rossland ore averaged approximately \$10.55 per ton; St. Eugene ore \$9.08; Snowshoe, \$4.76, Richmond-Eureka, \$40.84.

It is with gratification that shareholders here of the stock of the Le Roi 2, Ltd., hear that they are now to receive a third dividend of two shillings per share this year, which will possibly be followed by another such dividend at the end of the year from the earnings of the current period. It is certainly pleasing to note that this concern continues to pay dividends in the face of the somewhat heavy expense it is under in deepening the main Josie shaft. The output of the mine is being maintained at about 1800 tons of ore per month that should average \$23.00 per ton and which under existing conditions would mean a clear profit of \$10.50 to \$11.50 per ton.

The lessees of the Velvet-Portland group have a small crew of men working about the mine and on the road and bridges to the railway siding, a distance of seven or eight miles. The contract has been given for the haulage of ore and concentrates. Two 4-horse teams will be able to handle the output for the time being.

The bond which Chas. Dempster of Rossland and New York, has been working under on the Hattie Brown property in the debatable South Belt district of Rossland, has been permitted to lapse. It seems that one of the principal payments fell due a



few days ago and while the bondholders were willing to go ahead with the development work, on the showing that they then had, they did not consider it good business to make any large payments on principal. As the owners held out for the payment the bond was allowed to lapse and development work has been discontinued by the Dempster Syndicate.

The Fife Mines, Ltd., has ordered a 100 h.p. boiler plant and five drill compressor plant, drills, hoist, etc. for the property at Fife. It will be installed in about 45 days.

**Phoenix.**—The Boundary mines surpassed all past records for the week ending October 23rd, the total shipments for the district going up to 43,569 tons. With seven big furnaces working full blast at the Grand Forks smelter, the Granby sent down 27,573 tons of ore, exceeding the high record mark of February 13th by 2,000 tons. It is expected that the eighth furnace will be put to work next week, when the shipments will be even larger.

The British Columbia Copper Co. shipped 11,396 tons from the Mother Lode mine, which is the high shipment mark for the year. From the Oro Denoro property this company sent 950 tons, only exceeded previously this year by the shipments of the previous week, of 1,200 tons. This is considerably over the average of 300 tons per week that was maintained in the early part of the year. Regular shipments were made by the Snowshoe of about 3,800 tons.

The annual report of the Granby Con. M. S. & P. Co. for the year ending June 30th, 1909, which has just been made public, subsequent to the company's annual meeting, is a favourable one when the many drawbacks that occurred during the year are considered. The gross earnings of the company for the year amounted to \$3,983,536, while the net profits were \$681,134, or about 17 per cent. on the total earnings. From this amount \$270,000 was paid in dividends, the balance going to surplus. The total mining, smelting, converting and marketing charges per ton were \$3.20, which, after the deduction of gold and silver, made the cost price of copper to the company 10c per lb., which was .0024c lower than for the preceding year. Owing to the large quantities of ore that were caved during the year, the grade averaged low, the extraction being 21.81 lb. copper, .2724 oz. silver and .0434 oz. gold per ton. There was a saving, however, in mining costs, that more than equalized the cost of running the low-grade material through the smelter. The average price obtained for copper during the year was .1322c; silver, .5125c, which was somewhat lower than for the prior year.

A small crew of miners has been put to work in the Elkhorn mine at Greenwood by the Boundary Development & Exploration Syndicate.

The good work that has been going on in the Tulameen platinum district in the way of geological survey has been finished for the season, and Chas. Camsell, geologist in charge, has returned to Ottawa.

The Vermillion Forks Mining & Development Co., a London concern, has begun work on its property near Princeton. There is a quantity of coal now ready for shipment, and a couple of cars will be tried by the Hedley Mining Co. shortly. It is thought this coal can be laid down in Hedley for about \$5 to \$6 per ton, whereas, at present consumers there are paying in the neighbourhood of \$13 per ton for coal from the Crow's Nest and elsewhere. When the Princeton mines are producing a heavy tonnage, a market for part of the output may be found in Spokane, Wash., and vicinity, where this coal should be laid down at a reduction of a dollar or two below what consumers there are now paying.

While none of the New Dominion mines are at work yet, the trend of affairs is toward an early resumption of work. The unpaid wage cloud has now been cleared up. The old company owed its miners about \$22,000 when it closed down. The new concern did not feel obliged to liquidate this debt, but considered that it should be attended to, so that in future they would be on good terms with the miners, and thereby avoid any possible friction; so they proposed to pay the wages due on a basis of 75 per cent; the local merchants, anxious to see things squared up in this matter, granted a reduction of 12½ per cent. on accounts that were related to the matter, and after some deliberation the miners accepted. One of the crushers at Boundary Falls is being placed on the Rawhide ground, preparatory to resumption of work.

**Nelson.**—It is expected that the C. P. R. will equip its Rossland and Phoenix branches, on which ore is hauled, with electricity next summer, as its engineers find that economy of operation can be gained by using power from Bonnington Falls.

The output of the Crow's Nest Pass Coal Co. is being materially increased since the new compressor was installed.

Steady shipments are being maintained by the Blue Bell, Cork, Highland-Buckeye, Rambler-Cariboo, St. Eugene, White-water, Van Roi and Yankee Girl mines to Trail smelter.

The Searchlight group in Sheep Creek district has been acquired by a local syndicate, one payment being made. The second payment has been made on the Golden Fawn, adjoining the Mother Lode. A contract has been let for tunnel work on this property. The usual milling operations are going ahead in Sheep Creek district at the Nugget, Kootenay Bell, Queen mine, etc.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Inverness.**—A foolish attempt was made on Oct. 23 to wreck the works of the Inverness Railway and Coal Company. The offenders were U.M.W.A. strikers. The attack was to take place before daylight. Warning had been given the company. The attempt failed signally. Five men were arrested and summarily dealt with.

**Halifax.**—The search for Captain Kidd's treasure at Oak Island has been abandoned. The Old Gold Salvage and Wrecking Association of New York has stopped work. Captain Kidd has much to answer for. It is probable that this treasure was

buried in one of the unexplored gold districts. This is a reasonable enough assumption to justify ardent prospecting.

**Sydney, N.S., November 2.**—Although the Dominion Steel Co. is not giving out any monthly figures just now, it is understood that the output for October was more than satisfactory.

The rod mill output, especially, was very large, beating the world's record for one mill by several hundred tons.

### ONTARIO.

**Ottawa.**—The Public Accounts Blue Book gives figures of expenditure for the past fiscal year. In iron and steel bounties the



sum of \$1,864,614 was spent; in lead bounties, \$807,433; and in bounties on crude petroleum, \$260,698.

**Ottawa.**—Mr. Wilson Foster, of Dawson City, has presented to the National Museum a collection of ten thousand specimens of minerals, ores, and precious stones.

**Bancroft.**—The Bancroft marble quarries which contain notable quantities and several varieties of excellent marble, are being opened and equipped vigorously under the superintendence of Mr. T. Morrison.

**Madoc.**—Square-set timbering is being used at the Henderson talc mine at Madoc. Timbering costs about 15 cents per ton of output.

**Hamilton.**—The Hamilton Steel and Iron Company has announced that it will spend approximately \$1,000,000 on enlarging its plant to meet increased trade conditions. The majority of the stock is owned in Hamilton.

**Port Arthur.**—The Thunder Bay Harbor and Improvement Co. has almost completed building the dock for the Bessemer Iron Co. at Camp Beulah. There are 13,000 tons of ore on the dumps ready to be taken to the docks and loaded.

**Elk Lake.**—It is estimated that about ten cars of ore will be ready to ship from the Montreal River district this winter. At 25 tons per car and 1,000 ounces per ton—a pure guess—the possible shipments will aggregate 250,000 tons, roughly \$150,000 gross—not a negligible quantity of money.

#### BRITISH COLUMBIA.

**Phoenix.**—It is announced that the C.P.R. will immediately commence the construction of a branch line from Phoenix to Wellington camp. The first section to be built will be the first three miles of the twelve miles to Central Camp. The route is rough, grades are heavy, and considerable cutting and filling must be done.

The New Dominion Copper Company has issued checks to all unpaid miners of the former Dominion company. The total was \$20,000.

**Nelson.**—Marble quarrying has been actively begun at Marblehead. 75 men are employed. Three Sullivan channelers are installed. The output is about 12 cars per week.

**Vancouver.**—It is reported that the Guggenheims have gained control of the Western Fuel Company's properties on Vancouver Island.

**Rossland.**—The Hedley Mining Company is testing two carloads of coal from the Vermilion Forks Mining Company. If satisfactory, the fuel will be purchased regularly.

**Rossland.**—In the week ended October 30, Le Roi recommenced shipments of ore to Trail. 21 carloads were shipped, mostly from the 1650-foot level. The ore was of fairly high grade. This is the first shipment made since March. Diamond drilling has been successful in locating new ore bodies.

**Yukon.**—Discoveries have been filed with the mining recorder at Dawson on two streams tributary to the Forty-Mile River. One stream is Mickey Creek and the other Maiden Creek. The streams enter the Forty-Mile on the right limit between four and six miles from the mouth.

Stephen Macfie staked discovery on Mickey and William Hayhurst discovery on Malden. Both these streams had been prospected in early days.

Donahue Gulch, a tributary of the Yukon, on the right limit, five miles below Thistle, is the scene of a new discovery by Alex. Middleton and William Middleton. They also have staked two adjoining bench claims.

The renewals of placer claims the last ten days have aggregated 100, bringing the Government \$1,000 in fees. Thus far in October \$5,000 has been taken in for renewals, representing 500 claims. The properties are in all parts of the camp.

The quartz department is more than crowded. The quartz recorder is almost buried under the increased business in that department. He works under pressure all the time, and then, in order to keep up with the pace of stakers and applicants for certificates of all kinds, often is in the office after hours. The entire force of the gold office has none too much time.

## MINING NEWS OF THE WORLD.

#### EUROPE.

##### SPAIN.

**Lisbon, Oct. 22.**—It is announced that the Portuguese Government has granted a concession for mineral research over an area of 25,000 square miles in Portuguese East Africa, situated between latitudes 13 deg. 30 min. and 15 deg. 10 min., and not far from Blantyre, in British Central Africa, to a group of influential London and South African capitalists.

##### FRANCE.

**Paris, Oct. 22.**—On the 3rd November the technical delegates appointed by the British, French, German and Spanish Governments will meet at Paris to discuss officially from the technical point of view the draft Mining Law for Morocco provided for in the Algeiras Act and elaborated with Mulai Hafid's assent by M. Porche, a French engineer in the employ of the Maghzen. The results of this examination will be submitted to the diplomatic body at Tangier, in accordance with the Algeiras Act,

and, if approved by them, will be promulgated by the Sultan of Morocco. This procedure has been adopted with the object of simplifying the work of revision on the part of the diplomatic body at Tangier. M. Porche's draft law is framed with due regard to the peculiarities of foreign legislation on mining questions.

**Paris.**—M. Millerand, Minister of Public Works, announced on October 23 that in future mining concessions granted by his department will include a proviso that the miners shall share in profits. This was reaffirmed on October 26.

##### GERMANY.

**Halle on the Saale, Oct. 22.**—The newspapers state that in consequence of the riotous conduct of the strikers employed by the mining company which is working the Mansfeld copper deposits, the authorities last night despatched three companies of the 35th Regiment of Fusiliers and some companies of the 66th

Infantry Regiment to the scene of the trouble near Kupferhammerhütte. Four machine guns have been placed in readiness for emergencies.

**Berlin.**—With reference to the approaching international conference in Paris to elaborate a mining law for Morocco, the German Mannesmann group has taken the opinion of thirteen authorities on international law in various countries, including Professor Westlake. These are unanimously agreed that the Mannesmann concessions do not come within the scope of the conference, which they consider can only deal with future eventualities. These concessions cover an area amounting to one-tenth of the whole of Morocco and are situated in the Melilla region, beginning 30 kilometres (18½ miles) from the coast. The Sultan, Mulai Hafid, is interested in them, and has already obtained advances from Mannesmanns on the security of his interest.

### TURKEY.

...Constantinople.—Since the re-establishment of the Constitution, in July 1908, no fewer than thirty mining concessions have been granted to private persons, who, with two exceptions (British subjects at Smyrna) are all Ottomans. According to the terms of concession, two years are allowed in which the exploitation of the mine is to commence, failing which the concession is forfeited. The Government derives a benefit varying from 5 per cent. to 20 per cent. (according to the nature of the mineral) on the gross receipts, besides a tax of ten piastres per hectare of the extent of the mine. Work has not yet commenced on any of the new concessions, and a serious drawback to their proper working is the absence of roads. The mines for which concessions have been granted are situated in the vilayets of Aidin, Salonika, Brusa, Dardanelles, Trebizond, Uskub, Adana sandjat of Ismid, districts of Guebze and Kartal, near Constantinople, and comprise the following minerals—arsenic, manganese, argentiferous lead, antimony, copper, chrome, zinc, emery, lignite and iron.

### RUSSIA.

Among the questions now engaging the attention of the Russo-British Chamber of Commerce is the importation into Russia of machinery and instruments for the gold and platinum mining industries. By a decision taken in 1898 such articles were admitted duty free for a period of ten years. In 1908 the Ministry of Commerce declined to renew the privilege, and the gold and platinum industries have now addressed themselves to the Chamber of Commerce in the hope that the exemption of mining machinery from duty may be restored.

### AUSTRALIA.

During the past twelve months the export coal industry from Australia has been in a very depressed condition, and there are at present no signs of any improvement. The cause of the setback is attributable to the quiet state of trade all over the world and the lower prices at which coal has been selling in other countries, which have prevented the Australian collieries from competing in foreign markets. Tangible evidence of the unsatisfactory conditions which have prevailed recently is to be found in the dividend declared by the Scottish Australian Mining Company, which was at the rate of 7 1-2 per cent. per annum, as against 10 per cent. per annum in the first half of 1908. The distribution now declared is, of course, not altogether unsatisfactory, nevertheless, it does reflect the falling-off which has occurred in the company's business, which it is to be feared will make further progress before there is any revival.

**Perth, Western Australia.**—Press despatches dated November 10 bring the news that the surface structures of the Great Boulder gold mines have been destroyed by fire. The damage done is estimated at \$1,500,000.

**Sydney.**—Twelve thousand miners have gone on strike at the Newcastle and Maitland collieries. A general sympathetic strike is expected.

### SOUTH AFRICA.

**Pietermaritzburg, Oct. 25.**—The Natal Mining Commission recommends the establishing of a permanent Board and the granting of increased facilities for prospecting and larger rewards for discoveries of gold.

**Johannesburg.**—The foundations for the mortar boxes of the Randfontein Central mill are completed. The ore-bins will have a 5,500 ton capacity. The excavations for the sands and slimes plant are progressing rapidly.

There has been large buying of Rhodesia, Ltd., on the strength of the reconstruction scheme undertaken by Mr. Abe Bailey.

The Umkondo Copper mine in the Victoria District of Mashonaland, the property of the Consolidated African Copper Trust, upon which active work is proceeding, is opening up well.

The Transvaal Gold Mining Estates (Lydenburg district) are opening up a new reef on Peach Tree Creek, going 26 dwts. over 21 ins. About 10,000 tons have been developed.

The October profits of the Rand mines will make a slightly lower showing, owing to the scarcity of labour and relatively higher costs. An improvement in the labour supply is perceptible.

The improvement in the ore of the central section of the Consolidated Main Reef mine, recently reported, is maintained, and the position and prospects of the company are being steadily enhanced.

De Beers are recommencing work on the Bultfontein and Du-toitspan mines. The public of Kimberley is elated at the immediate prospect of renewed activity and revival in local conditions.

### SOUTH-WEST AFRICA.

A report issued by the German Colonial Economic Committee states that about 80 diamond winning companies have been formed in German South-West Africa, and the shares of about 25 of these undertakings are dealt in on the Bourse at Luderitz Bay. The strong resistance offered to the Regie Company at the beginning has been removed; the questions in dispute seem for the most part to have found a happy solution, although some difficult problems still await a settlement. The Diamond Leasing Company of Berlin has been formed to work the State diamond fields, and the German Diamond Company to work the "close district" of the Colonial Company for South-West Africa. About 50 per cent. of the value of the diamonds found has to be paid as taxes and the cost of production ranges from 2s to 10s per carat, according to local conditions. Since the beginning of activity of the Regie Company at the commencement of March down to the starting of October, 273,701 carats have been delivered, which have yielded \$399,060, of which the sum of \$193,500 has reverted to the State. The prices have gradually risen higher and higher and amounted in the case of the first nine deliveries on the average to 22s 5d per carat, 27s 3d, 27s 6d, 26s 11d, 28s 6d, 28s 1d, 28s 5d, 30s and 33s 8d respectively. At present the monthly output is about 45,000 carats, and it is expected that the monthly average for the current year will attain 45,000 carats.



**Lagos.**—The Government of Southern Nigeria has passed a new Ordinance regulating oil mining. New areas for mining may be notified, but they will be subject to restriction, and the Governor may declare that the holders of a lease are only entitled to drill for oil.

### SOUTH AMERICA.

#### CHILI.

**Santiago de Chile, Oct. 21.**—As a result of borings made by the Government engineers in Southern Chili, in the district between Chilos and the south of the river Paullin, valuable petrol springs have been discovered.

## Company Notes.

The Board of Directors of the operating company, La Rose Mines, Limited, will be constituted as follows: Messrs. Alex. Pringle, president; D. Lorne McGibbon, Shirley Ogilvie, Victor E. Mitchell, K.C., David Fasken, K.C., E. P. Earle, and R. B. Watson, general manager of La Rose Consolidated and Nipissing Mines, Ltd.

The Granby costs per pound of copper produced for the year ending last June, were 10 cents per pound.

The first general meeting of the shareholders of the Amalgamated Gold Mines of Sheep Creek, Limited, took place at Van-

couver on Oct. 30, at the company's offices, 506-508 Hastings Street West, at which organization was completed by the election of the following officers and directors:

President, Mr. F. C. Wade, K.C., Vancouver; Vice-Presidents, Mr. H. G. Neelands, Nelson, and Mr. F. L. Murdoff, Vancouver; Directors, Mr. H. A. Jones, Vancouver; Mr. Thomas Brown, Nelson, and Mr. J. L. Warner, Nelson. Secretary-Treasurer, Mr. D. G. Williams, Vancouver. This company has valuable holdings in the Sheep Creek gold camp.

At the meeting on Nov. 1st the Amalgamated Asbestos directors decided that the dividends on the preferred stock will date from January 1st. The first dividend for the quarter ending March 31st will be paid on April 1st.

**Ore Concentration Company.**—Advice has been received from the Sulitelma Company's mines in Norway that for the ten days ended 10th instant 341 tons of concentrates containing 6.73 per cent. copper, were produced by the Elmore process.

**Dividend No. 17 Kerr Lake Mining Company.**—The Board of Directors on Oct. 15 declared a regular quarterly dividend of four per cent. and an extra dividend of three per cent. upon the capital stock of the company, payable December 15th, 1909, to all stockholders of record at the close of business on December 1st, 1909.

**Le Roi 2** has declared its regular quarterly dividend of two shillings per share, payable Nov. 6.

## STATISTICS AND RETURNS.

The October outputs of the Nova Scotia Steel Co. were as follows: Steel, 7,148 tons; pig iron, 5,640 tons; coal, 77,130 tons.

### COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt Camp for the week ending Oct. 30, and those from Jan. 1, 1909, to date:

|                        | Oct. 30.    | Since Jan. 1. |
|------------------------|-------------|---------------|
|                        | Ore in lbs. | Ore in lbs.   |
| Buffalo .....          | 945,978     |               |
| Carnegie .....         | 63,410      |               |
| Chambers-Ferland ..... | 961,010     |               |
| City of Cobalt .....   | 1,100,122   |               |
| Cobalt Central .....   | 46,131      | 731,327       |
| Cobalt Lake .....      |             | 141,340       |
| Coniagas .....         |             | 1,356,515     |
| Crown Reserve .....    | 122,200     | 5,170,884     |
| Drummond .....         |             | 992,100       |
| Foster .....           | 187,800     | 187,800       |
| Kerr Lake .....        |             | 1,886,341     |
| King Edward .....      |             | 183,740       |
| La Rose .....          | 278,085     | 11,189,668    |
| McKinley-Darragh ..... | 96,000      | 1,739,424     |
| Nipissing .....        | 248,927     | 10,758,345    |
| Nova Scotia .....      |             | 480,810       |
| Nancy Helen .....      |             | 124,700       |
| Peterson Lake .....    |             | 324,040       |
| O'Brien .....          | 127,358     | 2,471,107     |
| Right-of-Way .....     |             | 2,533,226     |
| Silver Queen .....     |             | 684,814       |
| Silver Cliff .....     |             | 241,820       |
| Stewart, H. J. ....    |             | 62,393        |
| Temiskaming .....      |             | 1,626,060     |
| Trethewey .....        | 64,625      | 1,743,323     |
| T. & H. B. ....        |             | 1,106,260     |

Ore shipments to Oct. 30 from Jan. 1 are 48,806,586 pounds, or 24,403 tons.

Total shipments for week ending Oct. 30 are 1,171,123 lbs., or 585 tons.

### COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt Camp for the week ending Nov. 6, and those from Jan. 1, 1909, to date:

|                        | Nov. 6.     | Since Jan. 1. |
|------------------------|-------------|---------------|
|                        | Ore in lbs. | Ore in lbs.   |
| Buffalo .....          | 945,978     |               |
| Carnegie .....         | 63,410      |               |
| Chambers-Ferland ..... | 961,010     |               |
| City of Cobalt .....   | 1,100,122   |               |
| Cobalt Central .....   |             | 731,327       |
| Cobalt Lake .....      |             | 141,340       |
| Coniagas .....         |             | 1,356,515     |
| Crown Reserve .....    |             | 5,170,884     |
| Drummond .....         |             | 992,100       |
| Foster .....           |             | 187,800       |
| Kerr Lake .....        |             | 1,886,341     |
| King Edward .....      |             | 183,740       |
| La Rose .....          | 340,287     | 11,529,955    |
| McKinley Darragh ..... | 43,582      | 1,783,006     |
| Nipissing .....        | 65,560      | 10,823,905    |
| Nova Scotia .....      |             | 480,810       |
| Nancy Helen .....      |             | 124,700       |
| Peterson Lake .....    |             | 324,040       |
| O'Brien .....          | 64,000      | 2,533,107     |
| Right-of-Way .....     | 131,361     | 2,664,587     |
| Silver Queen .....     |             | 684,814       |
| Silver Cliff .....     |             | 241,820       |
| Stewart, H. J. ....    |             | 62,392        |

|                   |                  |
|-------------------|------------------|
| Temiskaming ..... | 1,626,060        |
| Trethewey .....   | 64,625 1,743,323 |
| T. & H. B. ....   | 1,106,260        |

Ore shipments to Nov. 6 from Jan. 1 are 49,451,376 pounds, or 24,725 tons.

Total shipments for week ending Nov. 6 are 644,790 pounds, or 322 tons.

Nelson, October 23.—The total ore shipments for the week in Southeastern British Columbia amounted to 52,191 tons, and for the year to date 1,507,327 tons. The smelter receipts were 49-336 and 1,389,500 respectively.

This is by far the largest weekly output so far this year, and away over the average. The Granby's tonnage, and that sent to the British Columbia Copper Company's smelter accounts for the very gratifying increase.

#### SOUTH-EASTERN B. C.

The following are the ore shipments and smelter receipts in detail:

##### ORE SHIPMENTS.

| Boundary—         | Week.  | Year.   |
|-------------------|--------|---------|
| Granby .....      | 27,573 | 808,850 |
| Snowshoe .....    | 3,837  | 120,094 |
| Mother Lode ..... | 11,396 | 233,074 |
| Oro Denoro .....  | 950    | 4,333   |
| Other mines ..... |        | 664     |

|             |        |           |
|-------------|--------|-----------|
| Total ..... | 43,756 | 1,165,015 |
|-------------|--------|-----------|

| Rosslund—          | Week. | Year.   |
|--------------------|-------|---------|
| Centre Star .....  | 4,093 | 142,855 |
| Le Roi No. 2 ..... | 463   | 25,260  |
| Do. milled .....   | 260   | 10,706  |
| Other mines .....  |       | 9,561   |

|             |       |         |
|-------------|-------|---------|
| Total ..... | 4,816 | 188,376 |
|-------------|-------|---------|

| Slocan-Kootenay—         |     |        |
|--------------------------|-----|--------|
| Queen, milled .....      | 420 | 17,430 |
| G. Poorman, milled ..... | 250 | 10,350 |
| W. Deep, milled .....    | 700 | 29,200 |
| K. Belle, milled .....   | 700 | 2,910  |
| S. Relief, milled .....  | 145 | 6,020  |
| Nugget, milled .....     | 110 | 4,570  |
| B. Bell, milled .....    | 900 | 37,400 |
| St. Eugene .....         | 377 | 17,340 |
| Whitewater .....         | 151 | 1,169  |
| Blue Bell .....          | 148 | 4,138  |
| Van Roi .....            | 81  | 779    |
| Rambler Cariboo .....    | 62  | 886    |
| Yankee Girl .....        | 79  | 2,175  |
| Highland Buckeye .....   | 26  | 160    |
| Hall .....               | 25  | 25     |
| Cork .....               | 21  | 384    |
| Eastmount .....          | 20  | 112    |
| Ruth .....               | 18  | 885    |
| Bismarck .....           | 16  | 294    |
| Other mines .....        |     | 17,140 |

|                   |        |           |
|-------------------|--------|-----------|
| Total .....       | 3,169  | 35,936    |
| Grand total ..... | 52,191 | 1,507,327 |

##### SMELTER RECEIPTS.

|                       |        |           |
|-----------------------|--------|-----------|
| Granby .....          | 27,573 | 807,300   |
| Trail .....           | 9,417  | 332,032   |
| B. C. Copper Co. .... | 12,346 | 237,407   |
| Le Roi .....          |        | 12,761    |
| Total .....           | 49,336 | 1,389,500 |

#### TORONTO MARKETS.

##### Metals.

Nov. 9.—(Quotations from Canada Metal Co., Toronto.)  
 Spelter, 6½ cents per lb. (strong).  
 Lead, 3.75 cents per lb.  
 Antimony, 8 1-2 to 9 1-2 cents per lb.  
 Tin, 32 cents per lb.  
 Copper, casting, 13.65 cents per lb.  
 Electrolytic, 13.75 cents per lb.  
 Ingot brass, 9 to 12 cents per lb. (metal market very steady).  
 Nov. 9.—(Quotations from Drummond McCall Co.)  
 Summerlee, No. 1, \$24.00 (f.o.b. Toronto).  
 Summerlee, No. 2 \$23.50 (f.o.b. Toronto).  
 Midland, No. 1, \$22.50 (f.o.b. Toronto).  
 Coal, anthracite, \$5.50 to \$6.75.  
 Bituminous, \$3.50 to \$4.50 for 1 1-4 inch lump.

##### Coke.

Nov. 5.—Connellsville coke (f.o.b. ovens).  
 Furnace coke, prompt, \$2.75 to \$2.85 per ton.  
 Foundry coke, prompt, \$2.75 to \$3.00 per ton.  
 Nov. 5.—Tin (straits), 30.60 cents.  
 Copper, prime Lake, 13 1-2 cents.  
 Electrolytic copper, 12.85 to 13.00 cents.  
 Copper wire, 14.50 cents.  
 Lead, 4.40 to 4.42 1-2 cents.  
 Spelter, 6.40 cents.  
 Sheet zinc, 8.50 cents.  
 Antimony, Cookson's, 8.37 1-2 cents.  
 Aluminum, 23 to 24.00 cents.  
 Nickel, 40.00 to 49.00 cents.  
 Platinum, \$28.50 to \$32.25 per oz.  
 Bismuth, \$1.75 per lb.  
 Quicksilver, \$50.00 per 75-lb. flask.

##### SILVER PRICES.

|                  |     |         |
|------------------|-----|---------|
| October 23 ..... | 50¾ | 23¾     |
| " 25 .....       | 50¾ | 23¾     |
| " 26 .....       | 50  | 23 1-16 |
| " 27 .....       | 50⅞ | 23 3-16 |
| " 28 .....       | 50⅞ | 23 5-16 |
| " 29 .....       | 50¼ | 23⅛     |
| " 30 .....       | 50  | 23⅛     |
| November 1 ..... | 50¼ | 23⅛     |
| " 2 .....        |     | 23¼     |
| " 3 .....        | 50⅞ | 23 3-16 |
| " 4 .....        | 50½ | 23¼     |
| " 5 .....        | 50⅞ | 23¾     |
| " 6 .....        | 50⅞ | 23 5-16 |
| " 8 .....        | 50¾ | 23¾     |

New York, November 2.—A large sale of copper, said to amount to 30,000,000 pounds, has been made by the United Metals Selling Company, the selling agents of the Amalgamated Copper Company, it was learned to-day and negotiations for still further sales of the metal are under way.

The price is believed to have been a fraction under 13 cents per pound, for electrolytic, or high grade metal.

The recent over-production of copper has caused no little concern among the trade, and to-day's news was regarded as an important advance toward the restoration of better conditions in that branch of the metal industry.

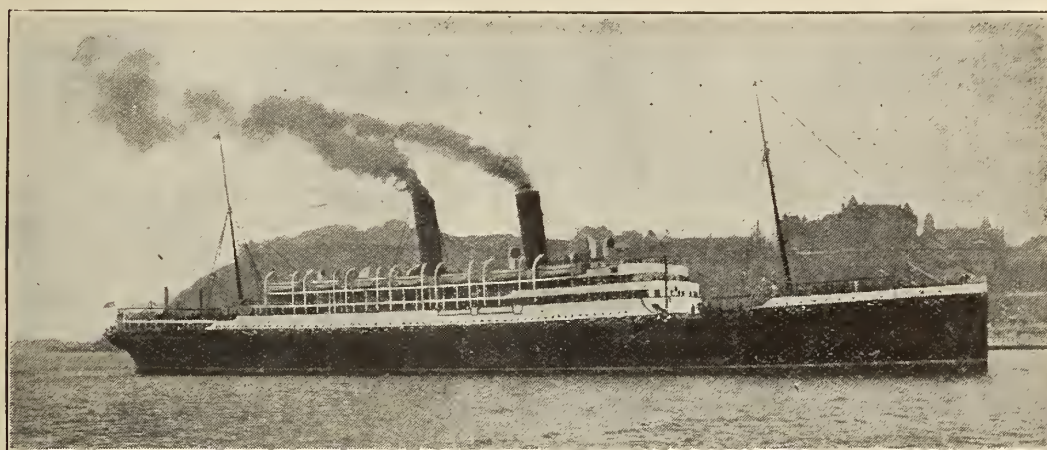


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|                                                               |                                    |                                                                                                                    |
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| <b>CHAPTER I</b><br>Mining Terms and Phrases.                 | <b>CHAPTER V.</b><br>CONTRACTS     | <b>CHAPTER VII</b>                                                                                                 |
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| <b>PART 1—Crown Lands.</b>                                    | <b>CHAPTER VI.</b>                 | <b>PART 1—Assessment.</b>                                                                                          |
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| <b>CHAPTER IV</b>                                             | (c) Leases.                        | <b>APPENDIX II.—Working Forms.</b>                                                                                 |
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1075. Gowganda Mining Division, 1908. W. H. Collins.  
1035. Coal Fields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia, 1908. D. B. Dowling.  
1050. Whitehorse Copper Belt, Yukon. R. G. McConnell.

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SEE INDEX TO ADVERTISERS PAGE XXVIII.

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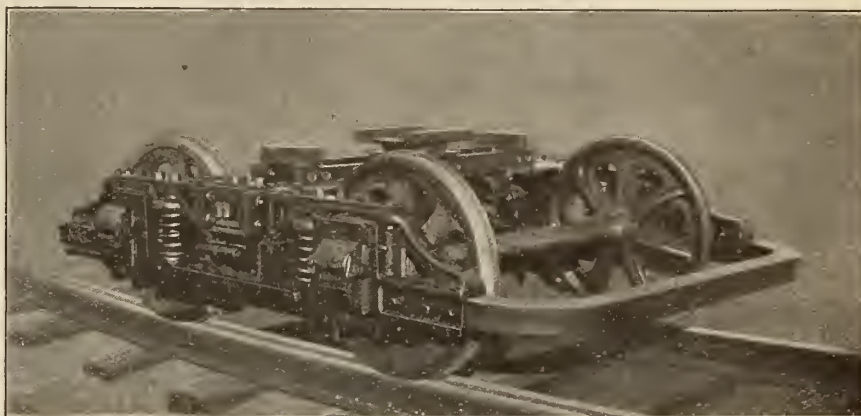
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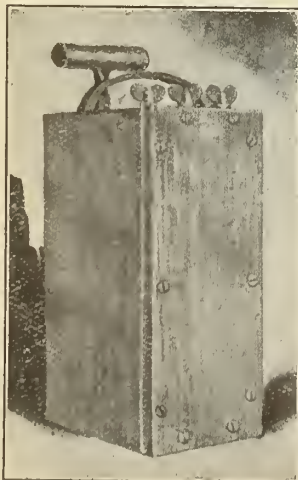
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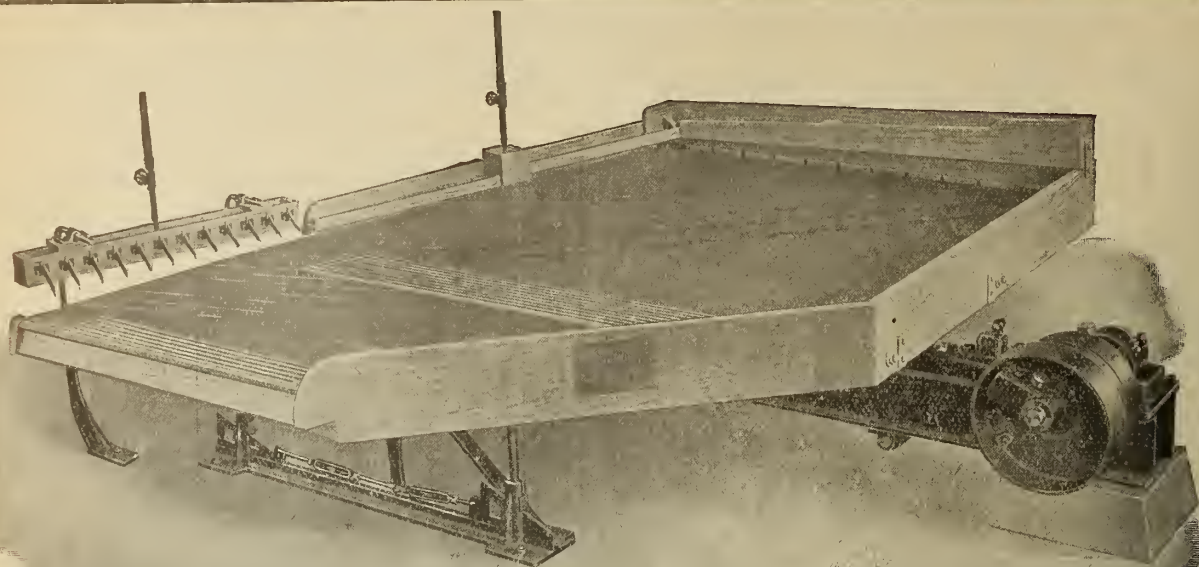
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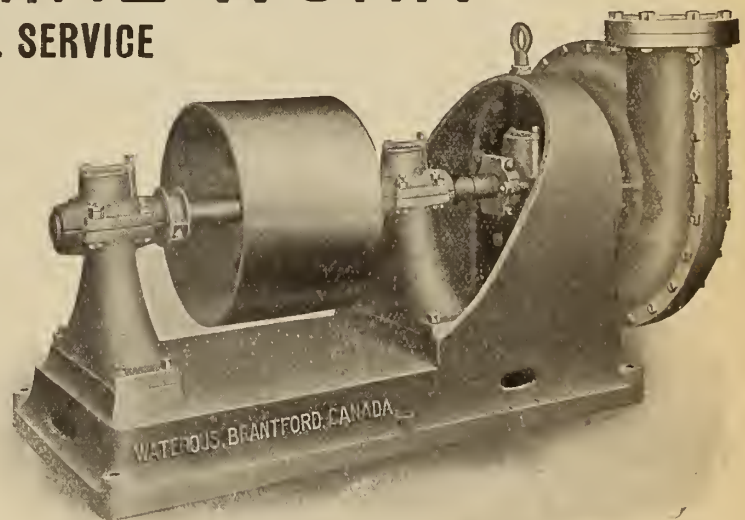
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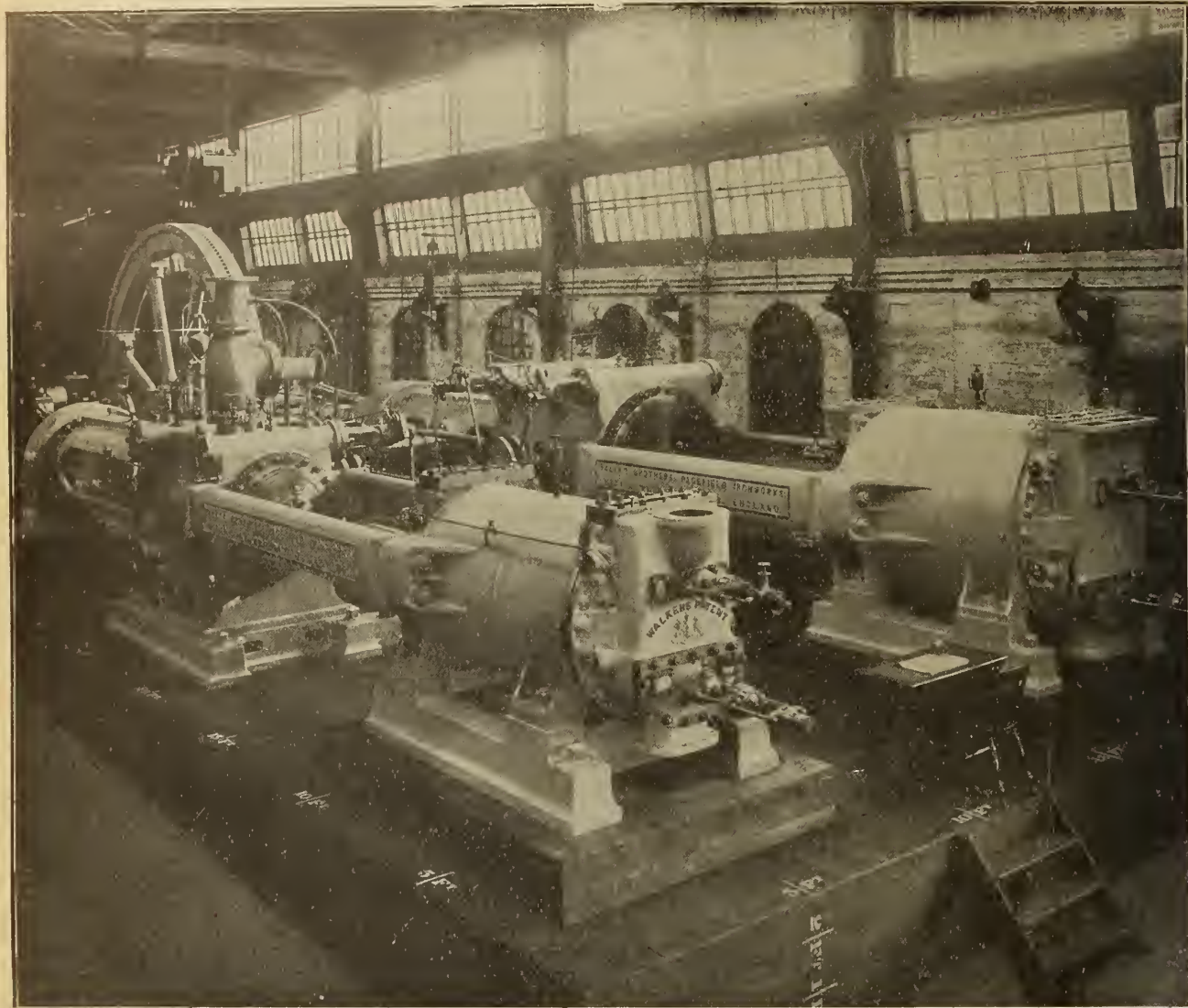
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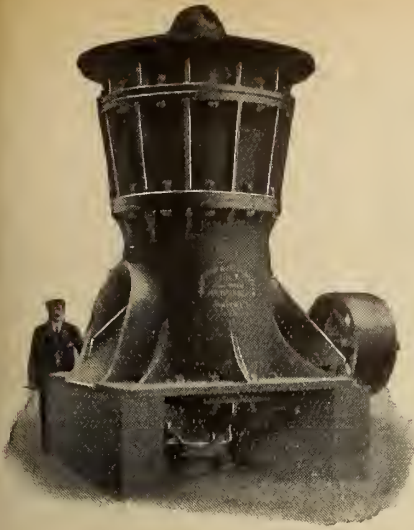
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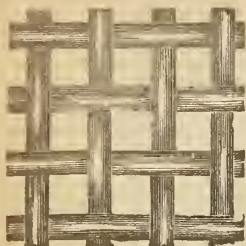
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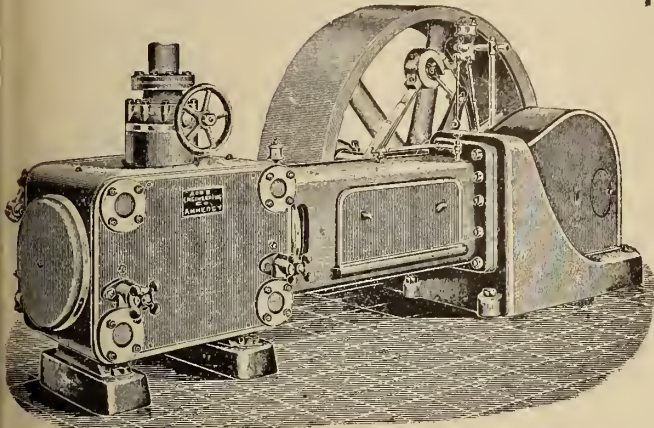
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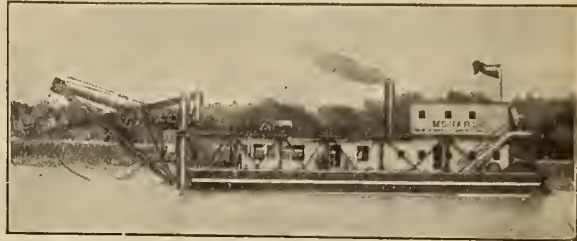
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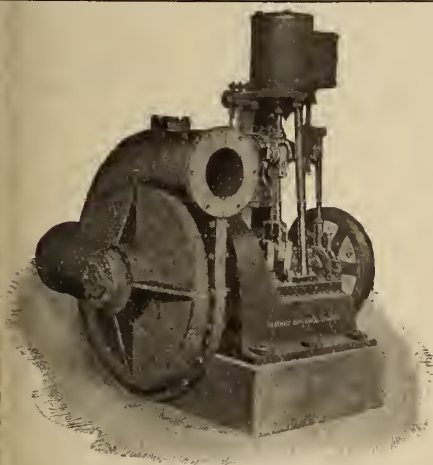
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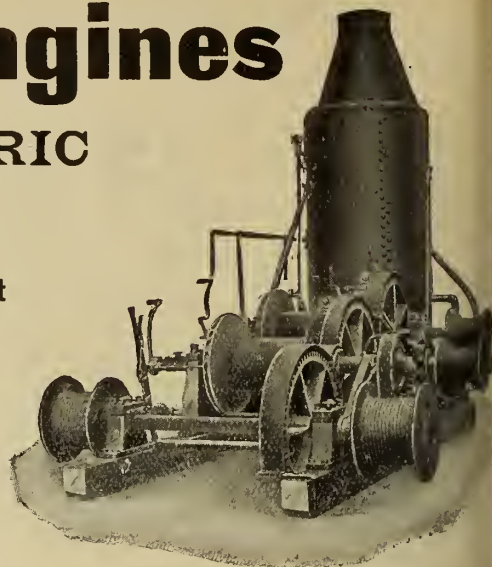
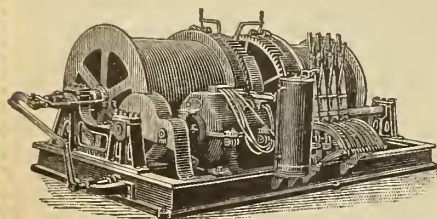
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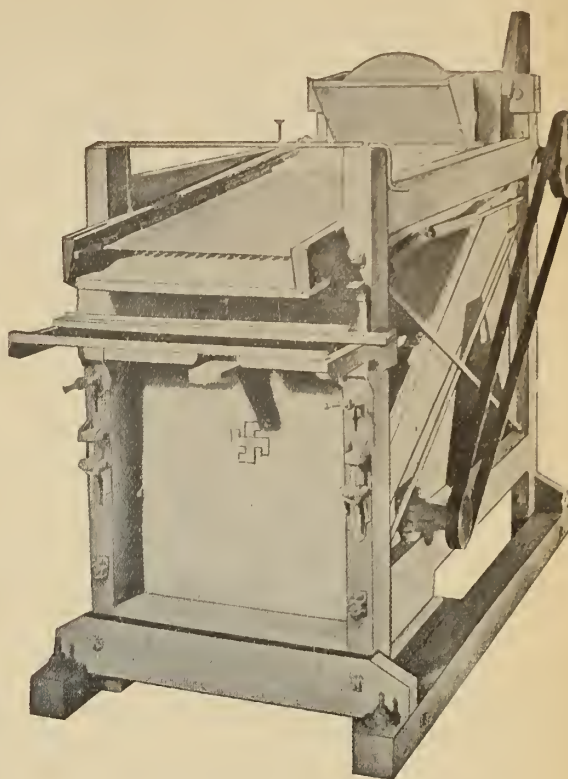
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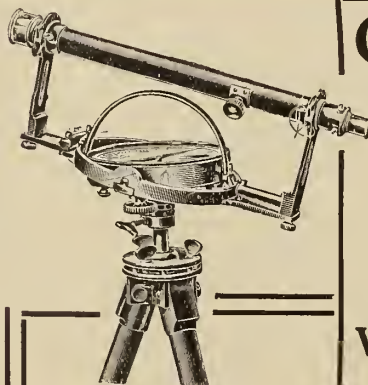
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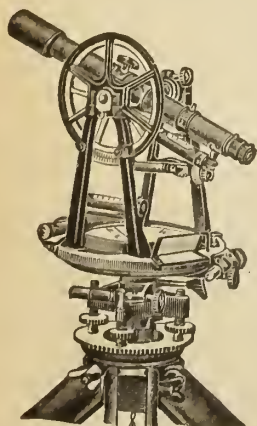
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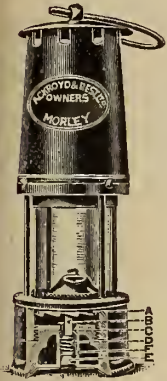
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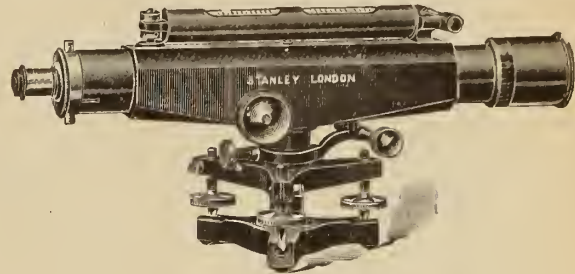
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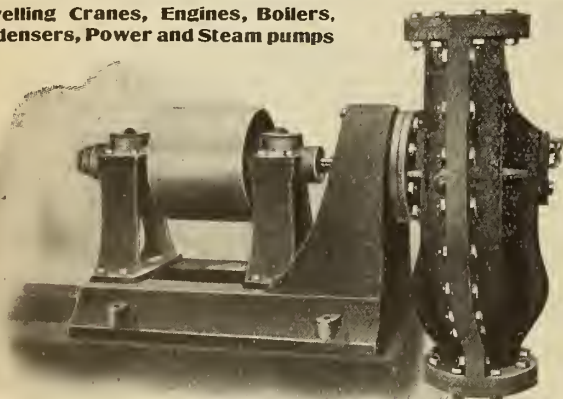
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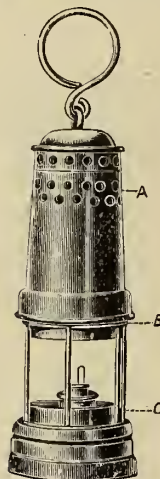
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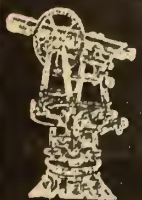
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, December 1, 1909

No. 23

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

**MINES PUBLISHING CO., LIMITED**

Head Office - Confederation Life Building, Toronto.  
Branch Offices Montreal, Halifax, Victoria, and London, Eng.

Editor:  
J. C. MURRAY, B.A., B.Sc

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### CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

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### THE COAL-STEEL MERGER.

All things work together for good. Possibly this dictum needs no restricting clause. The foolish squabble between the Dominion Iron & Steel Company and the Dominion Coal Company has been the direct cause of the pending amalgamation of these two huge enterprises—a dramatic climax to the litigious burlesque.

The first newspaper rumours of the merger were received with incredulity. Gradually, however, it became evident that Mr. James Ross, president of Dominion Coal and the largest individual stockholder in both companies, was prepared to retire from his commanding position. Mr. Ross, in whom there is concentrated much more than one man's share of pluck and pugnacity, made his own terms. But before touching on these particulars it may be well to review the physical assets and the financial standing of both companies.

The Dominion Coal Company commenced operation in 1893. The company's property comprises the greater part of the rich Sydney, Cape Breton, coalfield, the area of which is about 250 square miles. It also holds other coal land in neighbouring districts, including twenty-five square miles of submarine coal areas near Point Aconi. An estimate of the coal contents of the Dominion Coal Company's lands, made six years ago, places the total at 1,435,360,000 tons. Nine collieries, several of which are among the best equipped coal mines on the continent, contribute to the production of about 3,500,000 tons per annum—nearly half the total production of Canada. The company operates about 100 miles of railway, which is amply provided with rolling stock. It also owns a half interest in the Sydney and Glace Bay Electric Railway.

In addition to its complete establishments in the Glace Bay district, the Dominion Coal Company owns a system of loading piers at Sydney, Glace Bay, and Louisburg harbours, a fleet of ten colliers, a wrecking plant, and large modern discharging plants at St. John, N.B., and at Three Rivers, Quebec, and Montreal. The company also employs between 15 and 20 foreign-owned steamers.

The market area over which the output of the Dominion Coal Company is distributed embraces eastern Canada as far as Montreal, the island of Newfoundland to the east, and Boston to the south. Shipments are occasionally made to the West Indies. The collieries are ideally situated as regards ocean trade. Their position is, and will remain, commanding.

Ground was broken at Sydney, N.S., for the works of the Dominion Iron & Steel Company on August 10th, 1899. The winter and spring of 1901 saw the completion of the works as originally designed, comprising 400

by-product coke ovens, four blast furnaces, and ten open-hearth steel furnaces, together with the necessary accessory equipment.

The construction period, 1899 to 1902, was marked by prodigal expenditure. So reckless, indeed, was the outlay of funds that the company was in a very critical condition when, in the spring of 1903, the administration was changed and the management placed in the hands of Mr. Graham Fraser, with whom was associated his son, Mr. J. Dix Fraser. Radical economies were now effected, large additions were made to the plant, and, principally through the practical common-sense of Mr. Fraser, the enterprise was put on a sound footing. The additions to the steel plant made it possible to enter the Canadian market, and the Dominion Steel Company became what it is to-day, a Canadian industry.

The present plant, which is constantly being enlarged, consists principally of 500 by-product coke ovens, four blast furnaces, two Bessemer converters, one hot metal mixer, ten open-hearth steel furnaces, one blowing mill, one continuous billet mill, one rail mill, one rod mill. Subsidiary plants for the manufacture of chemicals and cement have been erected on the company's ground by other interests.

The history of the relations of the Dominion Steel Company to the Dominion Coal Company has been referred to frequently in these columns. It is sufficient to state here that until the reorganization of 1903 the Steel Company held a vague contract with Dominion Coal for "an assured supply of coal, on favourable terms and for a long period of time, for the use and benefit of" the Steel Company. By the terms of this contract the Steel Company had the right to lease and operate the Coal Company's properties, should it decide to do so within a certain specified time. A new and more reasonable agreement was entered into in 1903, whereby the Dominion Steel obtained suitable fuel on much more advantageous terms. The interpretation of this latter agreement was the crux of the litigation lately settled.

Previous to 1902 the Dominion Iron & Steel Company's bonded indebtedness was \$8,000,000; its preferred stock, \$5,000,000, and its common, \$15,000,000—a total of \$28,000,000. At that time the Dominion Coal Company's capital liabilities were as follows: Common stock, \$15,000,000; preferred stock, \$3,000,000; first mortgage bonds, \$2,801,500; total, \$20,801,500.

During 1902 the common stock of Dominion Iron & Steel was increased by \$5,000,000, and second mortgage bond issue of \$3,000,000 was made. Of the bond issue one-half was taken up at par by the directors.

The legal victory in its dispute with Dominion Coal put Dominion Steel, temporarily at least, in a fair position. In a later issue we shall examine this position more closely.

The Dominion Iron & Steel Company's total stock and bond issue stands now at \$34,368,833. Its gross earning capacity is about \$3,000,000 per year.

The Dominion Coal Company's total stock and bond issue is \$23,000,000. In earning capacity it far exceeds the Steel Company. Its administration is most efficient, its plant thoroughly efficient, and its departments highly organized.

The above rough sketch is designed merely to give our readers a conception of the magnitude of the two members of the proposed merger.

Of the merger, provided there is no injection of water, Canadians will approve. Undoubtedly it should facilitate the business of both concerns.

It is appropriate, however, to ask a leading question: Can the Coal Company, which has incurred heavy bonded indebtedness to insure a certain output the profits from which will meet present fixed charges, at the same time set aside a fund from its lessened earnings for the redemption of these bonds? Can it, further, provide out of these same earnings for the costly development of new mines?

It is only fair to ask these questions. Modern financiers have a characteristic tendency to ignore the underlying physical difference between mining and manufacturing. Mining is a venture in which money is made by the destruction of assets. Countless billions of tons of coal are worthless unless they can be mined at a net profit.

### RECENT COLLIERY DISASTERS.

The folly of using naked lights in coal mines continues to be exemplified by explosions and fires, both on this side of the Atlantic and on the other, attended by a wicked waste of human life. The newspaper despatches do not give a very clear idea of what actually happened at the appalling catastrophe in Illinois, but it is beyond a doubt that the fire originated through the criminally careless use of naked lights underground. The loss of 30 lives at the Darren colliery of the Rhymney Steel Company in Wales on the 29th of October is referred to in the Western Mail as follows:—

"Comparatively little damage was done to the workings, and to those who have a long experience of the Darren colliery the cause of the explosion is quite inexplicable. As a house coal colliery it has always been looked upon as the safest of pits, no gas having ever been detected there. In proof of this it may be stated that naked lights were used, and not safety lamps. The theory which finds most favour among experts and experienced miners is that through a rather heavy fall a quantity of gas was released, and this, being ignited by one of the naked lights, caused the explosion."

We may assume, therefore, that if safety lamps had been in use the disaster would not have occurred. It may also be safely assumed that when the mine is re-started safety lamps will be used.



The Darren explosion was marked by heroism of a kind remarkable even in the long roll of brave deeds that have attended colliery disasters in Britain. No less than five men gave their lives for their fellows in an unavailing attempt at rescue, and eight others were brought to bank in an unconscious state. The manager, the underground manager, and three other officials comprised the group of heroes who died in the work of rescue. The whole account of this disaster is such as to stir the blood and to make us feel that "gallant Wales" is still the mother of brave sons.

The other matter that is exemplified by these two disasters is the proper use of oxygen breathing apparatus. These devices were brought into use at both places. At Darren the rescue corps from the Aberamen Station arrived too late for the work of rescue. The explosion occurred at 4 a.m., and not until evening did the apparatus arrive at the colliery. But had trained men with proper equipment been on the scene at Darren when the blast occurred, the tale of rescue might not have been so gloomy. In saying this we would carefully guard against any suggestion of minimizing the work done by the rescuers. They gave their lives, and no man can do more than that. But brave men should not be permitted to imperil themselves amongst the deadly gases that follow a mine explosion, when science has provided a remedy.

At the Cherry mine, so far as one can learn, the breathing apparatus of the U. S. Geological Survey station has been used to good effect in preparing the way for the firemen and restoring the ventilation. Here again, however, had the apparatus been immediately available with a sufficient number of trained men, life might have been saved. Of this feature more exact details will enable a better judgment.

The following extract from a letter written by the superintendent instructor of the Aberamen Station is pertinent. He writes:—

"After the dead bodies were brought up on Saturday morning [at Darren] I received another wire at Deri, requesting us to go at once to Penrhewceber with our apparatus, as the pit was on fire and all the men below. So we hurried away to this place, and reached there early on Saturday morning, where we did some very good work. The fire had got up above the archwork, and seeing that we had a lengthy task before us, I arranged that the brigade should work in relays, to enable the men to get some rest. By Tuesday morning we had the fire practically out, and the men had worked well indeed. Once again the Draeger helmet proved a great success. I may mention that with the experience we have had, an apparatus without a helmet would have been of no use whatever. The helmets protected our faces from the steam given off."

At another colliery in England an outburst of gas

occurred in the workings, and the mine was cleared of the accumulation by men wearing helmets. Had this mine not been using safety lamps the helmets might have been required for a sadder task.

The points we wish to make are, first, that safety lamps should be used in all coal mines whether they are reputed "gassy" or not. Most of the dreadful explosions that have occurred in recent years have been at mines with a reputation for "safety." The Courrieres Mine, the Darr, the Monagahela, and the Cherry Mine, all were mines with a reputation for "safety." The use of naked lights is foolish and wicked.

The second point is that breathing apparatus for rescue work and fire-fighting in mines is valuable if it is immediately available. It may be compared exactly to other fire-fighting equipment. The usefulness of a fire brigade, everyone knows, depends more upon the rapidity with which a call can be answered than upon anything else. So with mine rescue apparatus.

Another interesting feature of the Darren explosion was the use of oxygen in reviving unconscious persons suffering from poisoning by fumes. One of the rescuers, a doctor, lay in the after-damp for over five hours, and he was given up for dead. When he was brought to the surface oxygen was administered, and after a long interval, the doctor regained consciousness, and was last reported as progressing favourably.

## THE GEOLOGICAL SURVEY AND PARLIAMENT

The work of any government department, to produce adequate results, must not be subject to extraneous interruptions nor to undue political influence. Ideally, political influence should be entirely absent.

The Geological Survey, under its present administration, has been effectively removed from the sphere of partisan interference. In accomplishing this, both the Minister and the Director have shown a fine disregard of "pull" and "privileges." Comment and commendation are superfluous. The situation speaks for itself.

The warmest admirer of the Survey will not claim that it is perfect. There are manifest weaknesses and discrepancies in the organization. But these weaknesses and discrepancies are not inherent. They arise altogether from the fact that the Survey is crippled financially. Its total appropriation has always been insufficient. Every year the demands upon the Survey have increased. Every year has seen the appropriation become more and more inadequate.

Now, there are two fundamental essentials without which the Survey would rapidly lose all meaning. First, its staff must be composed of capable, specially trained, professional workers. Men of the proper

type are hard to secure, and harder to retain. The salaries paid by the Survey are very much smaller than those offered by private corporations. Hence the only inducements that the Survey can offer are the honorable standing and the professional distinction that accrue to its servants. Without these inducements only the riff-raff of the profession could be engaged. Political office-seekers and their champions, if given any encouragement, could readily deprive the Survey of all chance of retaining first-class men.

The second desideration is a corollary of the first. Briefly, it is imperative that the Survey continue to enjoy the fullest confidence of mining men and investors. Without this confidence it would be out of the question for the Survey to attempt much of its most important work. Free access to mines and to records is necessary. This cannot be demanded. It is given only when private corporations know that confidences will not be betrayed.

At present the staff of the Survey is composed of men who rank with the best in any corresponding body anywhere. To a remarkable degree their reports are economic. The whole point of view of the Survey is coloured by the needs of the mineral industries. The officers of the Survey are active members of the Canadian Mining Institute. They are constantly in touch with mining problems.

It is also unqualifiedly true that the Survey enjoys the implicit confidence of the mining fraternity. This is a precious asset, an asset that must be guarded with utmost care. An irresponsible utterance in the House of Commons, baseless, irreparable criticism of a disappointed grafter, can do damage.

In short, the Survey has struggled and is struggling against almost insuperable obstacles. In spite of this it has been brought to a state of high efficiency.

What is least needed, what would most effectually injure the whole fabric of the Survey's credit, is hostile attention from members of Parliament. On the other hand, intelligent inspection will always be welcomed. And intelligent inspection of the Survey's work and methods will convince any impartial person that it is organically wholesome, clean and vigorous.

The Survey is doing its duty. Parliament has not done, is not doing, its duty in respect of the Survey.

### THE COALFIELDS AND A CANADIAN NAVY.

The question of a Canadian Navy has evoked many varied expressions of opinion in the public press of late, but one thing on which everybody should agree is the vulnerability of our shores to attack by an unfriendly nation. Probably at no place on the eastern seaboard of Canada could an enemy do more damage in a shorter time than in that bit of our coast that lies between Louisbourg and the Great Bras d'Or Entrance on either side of Sydney Harbour. Viewed from the three-mile limit at sea on a clear day, the Sydney coalfield presents

a striking picture, for between the old Gowrie mine and the new No. 3 Colliery of the Nova Scotia Steel & Coal Co. one can count over a dozen columns of smoke, each of which indicates a flourishing colliery, representing in each instance a capital expenditure of from \$250,000 to \$2,000,000. The spectator may recognize the tall chimney of No. 6 Colliery, the imposing bulk of No. 2 bankhead, the smoke of the new collieries at Lingan, and the typically English appearance of Old Sydney Mines No. 1.

Every one of these mines is within easy range of the batteries of a modern battleship, and half an hour's good practice with 12-inch guns would suffice to set every mine on fire and do irreparable damage. An enemy who desired to effect an occupation of these mines would not, of course, perpetrate such wholesale damage, but the enemy who fears the vengeance of a swiftly following British squadron will certainly choose this exposed and valuable outpost of Canada as one where a bombardment would serve the double purpose of working terrific destruction and of crippling the national coal supply. Summer after summer the residents of Sydney see the warships of foreign nations lie at anchor in Sydney Harbour, and in the piping times of peace their presence adds to the picturesqueness of a magnificent and spacious harbour. But in time of war, with a hostile "Dreadnought" in the offing and the British fleet at grips anywhere from Kiel to Vladivostok, what could the harbourmaster of Sydney do? He would be a foolish admiral that attacked the fortress of Halifax when the unprotected port of Sydney offered him a place to coal and refit, and nothing to say nay except the laughable equipment of the local militia artillery. The shareholders of the Dominion Steel and Coal Corporation need scarcely debate with themselves the advisability of a Canadian contribution to the naval expense of the Empire. The fleet that guards the Medway and the Solent guards also the dividends of Coal and Steel, and the coal supply on which the industrial activities of the eastern half of this Dominion chiefly depend.

### STABLE STARCH SOLUTION FOR VOLUMETRIC ANALYSIS.

One of the messy little troubles against which the metallurgical chemist must contend is the difficulty of making up a clear starch solution. The following formula, devised by Mr. A. H. Low, does not deteriorate, and remains clear, giving a satisfactory indication of the end-point in the iodide copper assay: After making up and filtering a cold saturated solution of commercial sodium chloride in distilled water, take 500 c.c., add 100 c.c. of 80 per cent. acetic acid and 2 grains of starch; Mix cold. Boil until nearly clear, or about two minutes. The starch is now entirely dissolved, and no filtering or settling is required. The starch may be used when cool.



# REPORT ON THE WHITEHORSE COPPER BELT YUKON TERRITORY

By R. G. McConnell.

Issued by the Geological Survey Branch, Department of Mines, Ottawa—Abstract Prepared for the  
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## Historical.

The history of the Whitehorse copper belt dates back to the early Klondike rush. Discoveries of copper croppings are reported to have been made by miners on their way to Dawson in the summer of 1897. The discoverers were hunting at the time, and the croppings were not located.

The credit of staking the first claim is due to Jack McIntyre, who located the Copper King, July 6, 1898. The Ora, a neighbouring claim, was staked by John Hanly on the same day. Later in the same year the Anaconda was staked by W. A. Puckett, and the Big and Little Chief by Wm. McTaggart and Andrew Oleson. In the following year the district was pretty thoroughly prospected on the surface, and most of the important claims, including the Pueblo, Best Chance, Arctic Chief, Grafter, Valerie, War Eagle, and numerous others, were discovered and staked.

In 1899, trails were constructed to several of the claims from Whitehorse, and development work was commenced on the Copper King, Anaconda, and Pueblo. Among the noteworthy events of that year was the bonding of the Pueblo, and a group of adjoining claims, to the British America Corporation. The bond was thrown up in 1901, after the completion of 235 feet of sinking and drifting, through what has since proved to be a lean, if not the leanest portion of the lode. No further mining was attempted on this claim until 1906.

The early development on the Copper King was carried out by McIntyre and Granger, the owners, and consisted in sinking on various surface croppings. In 1900 a small shipment of ore, the first from the district, was made from this claim. The shipment was made up of nine tons of rich bornite ore, and is stated to have yielded 46.40 per cent. of copper. A second shipment of 460 tons of high grade ore was made in 1903.

Other claims on which serious attempts at development were made in the early days of the camp are the Arctic Chief, Anaconda, Valerie, and Grafter. Work on the large magnetite ore body of the Arctic Chief was commenced in 1902, and has been prosecuted at intervals ever since. A shipment of 170 tons of selected ore was made in 1904. A small shipment was also made from the Valerie in 1903, the only ore so far from the southern portion of the camp. The early Grafter workings consisted of about 200 feet of sinking and drifting, and those on the Anaconda of about 300 feet of drifting.

Little progress was made during the year 1904-5, and the work done was practically limited to that required to hold the various claims. The rising price of copper in 1906 revived interest in the camp, and a number of the most promising claims were sold or bonded to individuals or companies. During the past season active development work was in progress on the Pueblo, Grafter, Arctic Chief, Best Chance, Copper

King, War Eagle, and Valerie, and small amounts of exploratory work were done on a number of other claims extending all along the belt.

The total amount of development work so far done in the district, including that of the past season, does not exceed 3,500 feet, and the total shipments to various coast smelters aggregate about 4,000 tons. This slow progress in a camp containing so many favourable showings is remarkable, and is attributed mainly to delay in providing proper transportation facilities. Most of the important mines are situated at distances of from four to seven miles from the present terminus of the White Pass Railway at Whitehorse, and are connected with it by wagon roads constructed by the territorial government. The transportation charges to Whitehorse by wagon amount to from \$3 to \$4 per ton, and from Whitehorse by rail and steamer to the various coast smelters to \$6 per ton. The large iron ore bodies on which the camp principally depends, are all comparatively low grade, averaging about four per cent. in copper, and the margin of profit on the ores under present conditions is small.

A spur line from the main line of the White Pass Railway has now been located along a portion of the copper belt, connecting closely with the principal mines, and cheaper transportation in the immediate future is assured. A large tonnage, probably half a million tons, is in sight at the various mines, as a result of recent development work, and extensive shipments are contemplated when the spur is completed.

## Situation and Communication.

The Whitehorse copper belt is situated in the southern part of the Yukon Territory, about 45 miles north of the British Columbia boundary, and extends along the valley of the Lewes River—the principal feeder of the Yukon—for a distance of about 12 miles. The town of Whitehorse, the distributing point of the district, is distant 110 miles from Skagway, at the head of Lynn Canal, one of the numerous west coast fiords. Easy communication with the coast is afforded by a well-built narrow-gauge railway, constructed across the Coast range to Lake Bennett in 1898-9 to facilitate transportation to the Klondike. In 1899-1900 the road was extended down Lake Bennett to Carcross, where it leaves the present waterway, and follows a wide parallel valley, now occupied for some distance by the Watson River, to Dugdale. Here it rejoins the Lewes Valley, and continues down it to the present terminus at Whitehorse, a mile below the Whitehorse Rapids.

Whitehorse, in addition to being the terminus of the railway from the coast, is also the head of navigation on the Yukon. In the summer season, lasting about five months, steamers sail regularly for Dawson, a distance of 450 miles, connecting there with larger steamers, which descend to the sea, a distance of 1,572 miles. In



the winter season communication is kept up by means of stages.

### Topography.

The main feature in the topography of the district is the great valley of the Lewes River. Opposite Whitehorse the valley has a width, from base to base of the enclosing hills, of fully four miles. It is bordered on the east by Canyon Mountain, a long symmetrical limestone ridge, rising to a height of 2,500 feet above the valley bottom, and 4,730 feet above the sea. The western boundary is more broken, and consists, from south to north, of the Golden Horn, a prominent peak 5,400 feet in height; a wide irregular ridge culminating in Mount McIntyre,\* 5,200 feet, and Mount Haeckel, 5,318 feet in height. These elevations are separated by wide drift-filled depressions, extending across the range.

The central portion of the old pre-glacial valley is floored with silts and boulder clays, and through these the Lewes has cut the narrow, winding secondary valley, about 200 feet in depth, in which it now flows.

The surface of the old valley rises gradually from the edges of the secondary valley to an elevation of about 600 feet at the bases of the enclosing ridges. It is rough and exceedingly varied in character. Small plains underlaid by silt alternate with rolling boulder clay hills and ridges, and these in turn are replaced at many points by areas of low, hummocky, granite hills; and near Hoodoo Creek by small cliff-bordered basalt plateaus. Short terraces occur frequently, but do not form continuous conspicuous lines along the valley.

A feature of the old valley bottom is the number of small canyon-like valleys, from fifty to a hundred feet or more in depth, which incise its rocky floor in all directions. Some of these carry the present drainage from the hills, while others are waterless, or enclose small drainless lakes, and were evidently carved out by temporary Pleistocene streams.

The streams of the district, with the exception of the Lewes River, are all small. The most important are Wolf, Hoodoo, McIntyre, and Porter Creeks. The derangement of the drainage system during the glacial period, and the partial deflection of the streams from their old courses, is illustrated by the varied character of their valleys. These are sunk through drift, and are wide and irregular where the pre-glacial channels are followed, and after leaving them become narrow rocky gorges.

The Lewes River, like the smaller streams, failed in places to regain its old channel after the disappearance of the ice. Above Whitehorse it swings to the west, away from its old course, and has sunk a new channel, several miles in length, through the basalt sheet which here underlies the drift. Miles Canyon, and the Whitehorse Rapids, with the intervening stretch of rapid water, are the results of this deviation. Above, and below these obstructions to its navigation, the Lewes widens out, and flows tranquilly along a valley excavated entirely in drift.

### Forest.

The wide bottom lands of the Lewes Valley, in the vicinity of Whitehorse, and the lower slopes of the bordering ridges, are clothed everywhere, except on a few dry hillsides and where fires have passed, with an

almost continuous and moderately dense forest growth. Ascending the slopes the trees become dwarfed and scattered, at an elevation of 1,700 feet above the river, or 3,800 feet above the sea, and 500 feet higher up cease completely. The upper slopes of the higher peaks and ridges are bare.

Timber for mining purposes is plentiful at present, notwithstanding the numerous destructive fires which have ravaged the district, and the supply in the immediate vicinity of most of the principal claims is ample for some years to come. When this becomes exhausted, the needs of the camp can easily be supplied from the forested valleys of the Upper Lewes and its tributaries.

### Waterpower.

The Lewes River, four miles above Whitehorse, contracts and flows rapidly through Miles Canyon. The canyon has a length of 3,000 feet. Below it the river widens out, but continues swift down to the Whitehorse Rapids, distant 2.75 miles from the head of the canyon. The fall of the river in the canyon is 16.2 feet, in the Whitehorse Rapids 9.5 feet, and in the whole stretch of rapid water 49 feet. Additional fall, if necessary, can easily be obtained by damming the river at the head of the canyon. Its width here is about 90 feet, and it is enclosed between nearly vertical basalt walls.

The Lewes River, according to measurements made by Mr. A. J. Beaudette, territorial mining engineer, has a flow at this point of about 135,000 miner's inches at ordinary stages of the water, and with even a moderate head, is capable of furnishing a large horsepower.

A second possible source of water is from Fish Lake, a sheet of water six or seven miles in length, situated in a high valley west of Mount McIntyre, at an elevation of about 1,450 feet above Whitehorse. Fish Lake discharges at present into the Takhini River. The pre-glacial outlet probably followed the depression between Mount McIntyre and Mount Haeckel, leading into the Lewes Valley; now drained by a branch of Porter Creek. The elevation of this pass, measured roughly with the aneroid, is less than that of the lake. The outlet of Fish Lake has a steep declination, and in the early summer months is a large, swift stream. Later on, the flow decreases rapidly, and at the end of September does not exceed 1,500 miner's inches. A large constant supply from this source can only be obtained by impounding the spring floods in the lake.

The streams crossing the Lewes Valley from the bordering mountain ranges, with the possible exception of Wolf Creek, are all too small to be used for power purposes.

### Mining Conditions.

The Whitehorse ores at present are shipped for treatment to the various coast smelters. Transportation charges from the mines to the smelters by wagon, rail, and steamer, amount to from \$8 to \$10 a ton. These charges, as stated in a previous page, will be materially reduced when the branch line along the belt from the White Pass Railway is completed. The ruling smelter charges for the siliceous ores are \$1.50 per ton, with a deduction of 1.3 per cent. of copper for loss. The iron ores, with a high excess of iron, receive more favourable treatment.

Wages in the district are not much higher than in British Columbia. Hand miners receive from \$3.50 to \$4 per day with board for eight hours' work, labourers \$3.50 for ten hours, carpenters and blacksmiths, \$4 to \$5, and engineers \$5 to \$6 per day. Supplies of all

\*Named after Jack McIntyre, the first claim-holder in the district. It has been called Mt. Granger, but this name is used by Mr. Cairnes to designate a mountain near Coal Lake, only a few miles away.



kinds are expensive, owing to the high inward freight rates of from \$50 to \$60 and upwards per ton.

Mining expenses are variable, and depend upon the character of the ore body and accessibility to Whitehorse. With the exception of pumps and steam hoists, no machinery has so far been installed. The altered garnetized rock usually encountered is hard, but breaks readily. Drifting with hand drills usually costs about \$15 per foot, and sinking from \$30 to \$40 per foot. The total cost of ore extraction in the large iron masses is not expected to exceed \$1 per ton.

#### Climate.

The climate at Whitehorse, notwithstanding the high latitude of 60° 45' N., is not unfavourable for mining operations. The summer weather is dry, seldom excessively hot, and is hardly surpassed anywhere. The winter season, lasting from November to April, is cold, sometimes extremely so, the thermometer occasionally dropping to 60° or more below zero. These cold spells are, however, exceptional, never last long, and do not seriously interfere with outside work. The ordinary winter temperatures of from zero to 40° below are not unpleasant, and entail no hardships when properly prepared for.

#### Economic Geology—General Characteristics of Ore Deposits—Distribution.

The copper belt, as determined by present discoveries, extends along the valley of the Lewes River, from a point east of Dugdale, on the White Pass Railway, northward to the base of Mount Haeckel, a distance of about twelve miles. The width of the belt seldom exceeds a mile, and in places is confined to a single line. The distribution of the discoveries along the belt is exceedingly irregular. The croppings follow a series of limestone areas enclosed in granite, or lying between granite and porphyrite. Where the limestone is absent the belt is practically barren; and considerable stretches of it otherwise favourable, such as that extending from the Spring Creek to the Pueblo claim, a distance of three and a half miles, are hopelessly buried beneath heavy accumulations of drift.

#### Ore Bearing Formations.

The rock formations of the district consist, in order of age, of limestone, porphyrites, granites and granodiorites, an extensive system of porphyrite dikes, and finally, basalts. Of these only the limestones and granitic intrusives are important economically. The principal ore bodies now being developed occur in the limestone, close to or adjoining the granite. Numerous discoveries have also been made in the granite, often at considerable distances from the limestone. The limited work done on these has not so far disclosed ore bodies of commercial value. The constituent minerals and general character of the ore bodies in the two formations are similar.

Copper minerals seldom develop in the porphyrites, but are not altogether unknown. The porphyrites are often closely interbanded with the limestones; and when this occurs in an altered area, both rocks are sometimes affected. The mineralization of the porphyrites is usually limited to a narrow zone, a few inches in width, bordering the limestone.

#### Principal Minerals.

The principal economic minerals of the district are the two copper sulphides, bornite, and chalcopyrite.

Tetrahedrite occurs at the Arctic Chief, and small bunches of chalcocite at the Best Chance, and other places. Copper minerals resulting from the oxidation of the sulphides are conspicuous at all the workings, but, except at the Pueblo, are seldom important as ores. They include the two copper carbonates, malachite and azurite, the red and black oxides cuprite and malaconite, and the silicate chrysocolla. The cuprite is occasionally associated with small grains of native copper.

The iron sulphides are not abundant and nowhere form large masses. Scattered grains of pyrite occur in the granites, altered limestones, and more frequently in the porphyrites, but are rarely found in connection with the ore bodies. Small quantities of pyrrhotite occur at the Arctic Chief. It was not observed elsewhere.

The iron oxides, magnetite and hematite, on the other hand, are widely distributed, and both occur in large masses. Magnetite is especially abundant, and is seldom absent from the mineralized areas. Lenses of this mineral, ranging in size from a few inches to 360 feet in length, are found all along the belt, mostly in the altered limestones, but also occasionally in the altered granites. Hematite is less common. It occurs in large tabular crystals at a number of the showings, and is the principal mineral in the great Pueblo lode.

Other metallic minerals of less frequent occurrence are arsenical pyrites, stibnite, galena, sphalerite, and molybdenite. Gold and silver in some quantity occur in all the ores. The values range from traces up to several dollars per ton. Gold is occasionally found native.

The principal non-metallic minerals accompanying the ores are garnet (andradite), augite, tremolite, actinolite, epidote, calcite, clinocllore, serpentine, and quartz. Of these, garnet, augite, calcite, and tremolite, are the most abundant. Quartz is sparingly distributed and seldom occurs in quantity.

#### Ore Bodies.

The ore bodies fall into two classes—those in which the copper minerals are associated with magnetite and hematite, and those in which various silicates, principally garnet, augite and tremolite, are the chief gangue minerals.

The magnetite ore bodies are numerous, and occur enclosed completely in altered limestone, along the lime-granite contact, and in a few instances, in areas of altered granite. The largest bodies so far discovered are the Best Chance, 360 feet in length; the Arctic Chief, 230 feet, and the Little Chief, 100 feet. The magnetite masses are always sprinkled more or less plentifully throughout with grains and small masses of bornite and chalcopyrite. The two sulphides occur, both separately and intergrown, and are of the same age as the enclosing magnetite. The copper percentage varies greatly in different parts of the same lode, the general average approximating four per cent. The gold and silver are negligible in some of the ore bodies and important in others.

Besides the copper minerals, serpentine, calcite, clinocllore and other secondary minerals, are often associated with the magnetite, and rarely pyrrhotite and sphalerite.

Hematite masses are much less common than magnetite, only one large body being known. This is the Pueblo lode, on Porter Creek. The upper explored portion has developed altogether in limestone. Granite outcrops in the vicinity, but its contact with the limestone is concealed by drift. It differs from the mag-



netite ore bodies principally in the greater oxidation of the copper minerals. It is more porous and the original sulphides or sulphide have been largely converted by surface waters into carbonates, oxides, and silicates. Some chalcopyrite survives in portions of the lode. No bornite has been found.

Showings characterized by a garnet-augite-tremolite gangue are numerous wherever the lime-granite contact is exposed. They vary in size from a sprinkling of copper minerals to considerable lenses of shipping ore, such as those developed on the Grafters, Copper King, War Eagle and Valerie. All the important ore bodies of this class, so far discovered, occur in the limestone, close to the granite, and are often separated from the granite by a zone of more or less completely replaced limestone. The valuable minerals are similar to those in the iron masses, and consist mostly of bornite and chalcopyrite, carrying small quantities of gold and silver. At the Valerie, bornite is absent, and the chalcopyrite is associated with mispickel, the only known occurrence of this mineral in the camp.

The ore bodies of this class are occasionally tabular in shape, and have the appearance of following particular limestone beds; but in most cases the outlines are very irregular. The Copper King and Valerie lodes are short and blunt, while that on the Grafters, as shown in the present workings, is shaped like a horseshoe, and partially encircles a core of unreplaced limestone. The copper minerals at the Grafters and Copper King stop rather abruptly against a marble foot-wall; but as a rule they have no definite limit, and extend in diminishing quantities for some distance beyond the valuable portions of the lode. In some instances, as on the Anaconda, the ore alternates with bands of limestone, and limestone replaced by garnet and augite.

None of the ore bodies has so far been followed to a greater depth than 100 feet, and the question of downward extension has not been decided practically. At the limited depths reached, some of the lodes show increased and others decreased volumes, while the character of the ore remains unchanged. Contact replacement deposits, the class to which these belong, are apt to be buncchy, and somewhat uncertain; but theoretically may descend as long as the limestone lasts. They are dependent on the limestone, and the deposits formed in the larger areas will probably prove more permanent than those in the small inclusions. The latter are themselves liable to be cut off a short distance below the surface.

The copper percentage in the siliceous ores is higher as a rule than in the iron ores, those shipped up to the present time probably averaging over eight per cent. The precious metal contents are moderate, seldom exceeding \$3 per ton.

The following analyses of the Arctic Chief magnetite ore and of siliceous ores from the Grafters, War Eagle and Valerie, are furnished by Mr. Robert Smart, territorial assayer, Whitehorse, Yukon Territory:—

|                           | Arctic Chief. | War Eagle. | Grafters. | Valerie. |
|---------------------------|---------------|------------|-----------|----------|
| Gold, oz. per ton.....    | 0.21          | 0.05       | 0.05      | 0.075    |
| Silver, oz. per ton.....  | 1.20          | 3.30       | 1.55      | 1.05     |
| Copper, percentage...     | 3.21          | 8.80       | 7.90      | 12.90    |
| Iron, " " " " " " " "     | 45.50         | 4.40       | 7.12      | 6.39     |
| Alumina, " " " " " " " "  | 12.08         | ...        | 3.88      | 1.95     |
| Magnesia, " " " " " " " " | 6.71          | 3.00       | ...       | 5.65     |
| Lime, " " " " " " " "     | 0.20          | 23.50      | 21.84     | 44.36    |
| Silica, " " " " " " " "   | 9.67          | 55.80      | 56.01     | 23.91    |
| Sulphur, " " " " " " " "  | 2.53          | 6.60       | 2.78      | 4.21     |

### Oxidation.

The ore bodies come to the surface practically unaltered, the gossan capping having disappeared during the glacial period. The copper minerals in the dense magnetite masses are slightly oxidized on exposed surfaces along the sides down to the lowest depth reached, and following occasional partings, but the percentage affected is small. The hematite masses, as represented by the Pueblo lode have suffered more. While the iron shows little change, the copper sulphides, down to a depth of 100 feet at least, are largely replaced by carbonates and other derivative minerals.

The oxidation of the siliceous ores varies with the gangue, but is nowhere extensive. It is greatest where the sulphides, as rarely happens, are enclosed in limestone, and decreases as the proportion of limestone lessens. Where the gangue is composed of a compact mass of secondary minerals, little alteration is noticeable, except on the immediate surface.

### Classification.

The Whitehorse copper ores possess all the characters distinguishing ordinary contact metamorphic deposits. They occur mostly in metamorphic limestone close to or in direct contact with the granite or granodiorite which altered it. Veins, with the exception of occasional thin seams evidently of secondary origin, are unknown. The ore bodies are irregular in outline, are occasionally banded, and vary in size from small lenticles a few inches across—often completely enclosed in limestone—to masses measuring hundreds of feet in length. The constituent minerals are those that everywhere characterize contact deposits. The common ore minerals are magnetite, hematite, bornite and chalcopyrite, and those less frequently found: tetrahedrite, chalcocite, molybdenite, mispickel, galena, stibnite, pyrrhotite, pyrite, zinc blende and rarely free gold. The gangue minerals include garnet, augite, tremolite, actinolite, epidote, scapolite, quartz, and calcite. The minerals, both metallic and non-metallic, were deposited metasomatically in the limestone and granite and, with trifling exceptions, are products of one period of mineralization.

There is one important point, however, in which the deposits in question differ somewhat from the published descriptions of other members of this class, viz., in the intense and widespread mineralization of the intrusive itself. While the large aggregates of metallic minerals occur in the limestone or along the contact, numerous small bodies and scattered grains are frequently found wholly enclosed in granite, often at a considerable distance from the limestone. Instances of this occur at the Pueblo No. 5, Whitehorse, Keewenaw, and other claims. At the Best Chance large grains of chalcopyrite occur in granite, which microscopically show little alteration.

The development of non-metallic minerals in the granite is probably greater than in the limestone, and the areas affected are wider and more extensive. At the Arctic Chief the granitic rocks are well mineralized for a distance of 400 feet back from the lime contact.

The minerals found in the granite are similar to those in the limestone, although the proportions are somewhat different. The most important are the brown lime-iron garnet andradite, augite, and green epidote. At a number of points both rocks are wholly replaced where they meet, and the original contact usually sharply defined is completely obscured. It is



represented by a compact mass of secondary minerals, which fade into granite on the one side, and limestone on the other. The transmission from wholly altered to unaltered rock is usually more abrupt in the limestone than in the granite.

The origin of contact deposits, such as these described, has recently been thoroughly discussed by Lindgren, Vogt, Weed, Kemp, and others, and the general conclusion reached, that they are directly due to the passage of gaseous or liquid emanations, laden with the requisite materials from a cooling, but still liquid intrusive magma into the bordering sedimentary, is now generally accepted. In most cases described the migration of material was lateral and the ore deposits formed in the sedimentary before the adjoining magma solidified. The extension and simultaneous mineralization of both the intruding and intruded rocks in the Whitehorse district can hardly be explained except by assuming that the movement was upward, and took place after the former hardened to some depth. The conditions indicate that both the porous limestone and the jointed granite furnished channels for the ascending solutions.

The behaviour of the aplitic dykes is also signifi-

### Geology.

The Arctic Chief ore body is strictly a contact deposit between limestone, and a granitoid rock of variable composition, but mostly a hornblende granite. It is situated on the west side of a long irregular limestone bay, penetrating the granite area in a northerly direction. The limestones enclosed in the bay are similar to those along other portions of the copper belt. They are homogeneous crystalline rocks, white to greyish in colour, and as a rule remarkably free from inclusions and impurities, except near the contact with the intrusive. They have been welded into solid masses in places, but over most of the area the bedding is even and regular.

The bordering intrusive, in the vicinity of the ore body, is an altered quartz diorite, loaded with secondary minerals, among which garnet, augite, epidote, calcite, chalcopyrite, and magnetite are conspicuous. The dioritic phase is local, and the diorites pass towards the west and north into hornblende granites, and the sections show a further transition, at one point, into hornblende syenite.



cant in this connection. They are not abundant, but the few examples seen in the mineralized areas all show more or less alteration. Granite dykes, apophyses from the main granite area, traverse both the Little Chief and Pueblo iron lodes. In both instances the dyke material is now largely replaced; in the former by magnetite, and in the latter by hematite. The later porphyrite dykes occasionally found cutting the ore bodies have not been affected.

#### Description of Some of the Principal Mines and Prospects—Claims in the Central Part of the District—The Arctic Chief.

The Arctic Chief is situated near the centre of the copper belt, at an elevation of 922 feet above Whitehorse, and 3,012 above the sea. A wagon road, 7.1 miles in length, connects it with the present railway terminus at Whitehorse. It was staked July 12, 1899, by Capt. John Irving, of Victoria, B.C. During the past season it was under bond to the Arctic Chief Copper Mines Company, with headquarters at Spokane, Wash., U.S.A.

The granites near the Arctic Chief ore body are exceptionally strongly mineralized. The affected area has a length of 1,000 feet, following the limestone contact, and a width of 400 feet. The mineralization is not uniform, and gradually diminishes away from the ore body. Where most intense, the original rocks are almost entirely replaced by alternating bands and masses of garnet, and a green augitic rock, classed as pyroxenite. The highly altered areas are often clearly traceable into unmistakable granites, holding scattered crystals, and masses of garnet and epidote, and farther away into the unaltered variety.

The principal secondary minerals present are, garnet, augite, epidote, magnetite associated with bornite and chalcopyrite, actinolite, and seapolite. Epidote, while not occurring in such quantities as garnet, is found over a wider area. Magnetite occurs in small and large lenses, and is widely distributed in individual grains. Pink seapolite is conspicuous in places, but is not quantitatively important.

A few small inclusions of crystalline limestone occur in the altered granitic area, and may have influenced

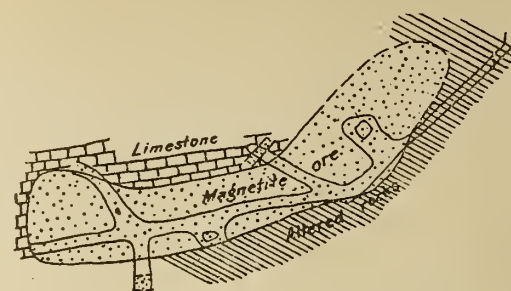


its mineralization. They contain the same secondary minerals as the granite, but in somewhat different proportions. Brown andradite is the chief mineral in both rocks, while epidote is relatively less abundant in the limestones than in the granite.

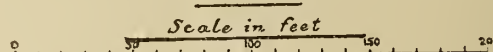
A number of large dykes occur in the vicinity of the Arctic Chief lode, cutting sharply across both limestone and altered granite. They were intruded after the formation of the ore bodies, and had no effect on the mineralization of the region.

#### Development.

The Arctic Chief ore body outcrops on rising ground, and has been opened up by means of a tunnel. Development work commenced in 1902, but has proceeded slowly. The present owners are making a systematic attempt to define the limits of the ore body. The principal workings consist of a tunnel, 230 feet in length, with short cross-cuts at intervals to the walls of the lode. The tunnel, with the exception of the first 65 feet, follows ore throughout. A shaft has been sunk near the centre of the ore body, to a depth of 50 feet below



OUTLINE OF ARCTIC CHIEF ORE BODY ON MAIN LEVEL



the main level; and an upraise to the surface, 65 feet in length has just been completed. The lower part of the shaft is in altered diorite, and some drifting was done from the foot of it during the past season; to determine the character of the ore body at that level. The drifting was not extensive enough to give positive results.

(To be continued.)

## THE PRODUCTION OF ASBESTOS IN CANADA

By John McLeish, B.A.

Asbestos is mined in Canada in the Eastern Townships, Province of Quebec, at Black Lake, Thetford, East Broughton and Danville. Other occurrences of the mineral have been noted, and some shipments were at one time made from the Township of Denholm, in the county of Wright, north of the city of Ottawa, but the first-mentioned districts are the only localities in which mining is at present being carried on. The mining of asbestos in this region dates from about 1878, and statistics of production since 1880 are shown in tables following. The value of the annual output has grown from less than \$25,000 in 1880 to over \$2,573,000 in 1908, so that next to coal this is now one of the most important of non-metallic mineral products, and supplies a very large proportion of the world's demand. A special report on this subject has been published by this

branch, though now unfortunately out of print. A revised edition is, however, in course of preparation.

#### Production.

A portion of the output is sufficiently high grade to be shipped as crude; the greater part, however, is crushed and the fibre extracted by special machinery. A uniform system of classification has not yet been adopted by the operating companies, but for statistical purposes the shipments have been classified on a valuation basis, the crude being divided into two classes and the mill fibre into three grades; the short fibred, asbestic, and sand, being separately classified.

The total shipments in 1908 aggregated 90,773 tons valued at \$2,573,335, as compared with shipments in 1907 of 90,426 tons valued at \$2,505,042, the shipments in 1908 being the largest both in tonnage and value yet recorded. Details are given in Table I.

ASBESTOS.—TABLE 1.

Production by Classes, Calendar Years 1907 and 1908.

|                        | 1907.       |           |          | 1908        |           |          |
|------------------------|-------------|-----------|----------|-------------|-----------|----------|
|                        | Short Tons. | Value.    | Per ton. | Short Tons. | Value.    | Per ton. |
|                        |             | \$        | \$ cts.  |             | \$        | \$ cts.  |
| Crude, No. 1.....      | 1,419       | 374,275   | 263 76   | 857½        | 257,752   | 300 59   |
| " 2.....               | 2,908       | 456,357   | 156 93   | 2,488       | 411,480   | 165 38   |
| Mill Stock, No. 1..... | 3,675       | 300,925   | 81 88    | 5,282½      | 425,448   | 80 54    |
| " " 2.....             | 43,821      | 1,247,078 | 28 46    | 45,545½     | 1,345,750 | 29 33    |
| " " 3.....             | 10,307      | 106,132   | 10 30    | 12,374½     | 114,931   | 9 29     |
| Total asbestos.....    | 62,130      | 2,484,767 | 39 99    | 66,548      | 2,555,361 | 38 40    |
| Total asbestic.....    | 28,296      | 20,275    | 0 72     | 24,225      | 17,974    | 0 74     |
| Grand total.....       | 90,426      | 2,505,042 | .....    | 90,773      | 2,573,335 | .....    |



While the average prices in each class are given in the above, the classification is based approximately on the following maximum and minimum prices per ton:—

Range of Prices of Asbestos During the Years 1907-8.

|                        | 1907.  |           | 1908.  |           |
|------------------------|--------|-----------|--------|-----------|
|                        | \$ c.  | \$ c.     | \$ c.  | \$ c.     |
| Crude, No. 1.....      | 225 00 | to 300 00 | 267 00 | to 350 00 |
| " 2.....               | 100 00 | " 200 00  | 75 00  | " 225 00  |
| Mill Stock, No. 1..... | 57 09  | " 163 00  | 60 00  | " 100 00  |
| " " 2.....             | 18 00  | " 50 00   | 20 00  | " 50 00   |
| " " 3.....             | 8 00   | " 15 00   | 5 00   | " 13 00   |
| Asbestic.....          | 0 50   | " 2 00    | 0 35   | " 1 16    |

Although the total tonnage shipped in 1908 was only 347 tons in excess of the 1907 shipments, it will be seen that the amount of crude shipped in 1908, despite a higher average price, was less than the 1907 crude shipments by 981 tons. The fibre shipments on the other hand were 5,399 greater in 1908, and brought a higher average return per ton of \$1.22. The asbestic shipments in 1908 were 4,071 less than in 1907.

In Table 2, following, the production of crude asbestos and mill stock since 1903 is separately shown. The statistics indicate that during the past six years there has been only a slight increase in the quantity shipped as crude, although the average price has nearly doubled; while on the other hand the shipments of mill stock have increased over 125 per cent. in the same time, with an increase of over 50 per cent. in the average price per ton obtained.

ASBESTOS.—TABLE 2.

Annual Production of Crude and Mill Stock 1903-1908.

| Calendar Year. | CRUDE       |         |          | MILL STOCK. |           |          |
|----------------|-------------|---------|----------|-------------|-----------|----------|
|                | Short Tons. | Value.  | Per ton. | Short Tons. | Value.    | Per ton. |
|                |             | \$      | \$ cts.  |             | \$        | \$ cts.  |
| 1903.....      | 3,134       | 361,867 | 115 46   | 27,995      | 554,021   | 19 79    |
| 1904.....      | 4,410       | 534,874 | 121 28   | 31,201      | 678,628   | 21 75    |
| 1905.....      | 3,767       | 472,859 | 125 53   | 46,902      | 1,013,500 | 21 61    |
| 1906.....      | 3,841       | 635,345 | 165 41   | 56,920      | 1,401,083 | 24 61    |
| 1907.....      | 4,327       | 830,632 | 191 97   | 57,803      | 1,654,135 | 28 62    |
| 1908.....      | 3,345½      | 669,232 | 200 04   | 63,202      | 1,886,129 | 29 84    |

Table 3 shows the total shipments of asbestos and asbestic separately for each year since 1880.

demand, the Canadian output of asbestos finds a wide distribution.

Exports and Imports.

Supplying as it does the greater part of the world's

During the twelve months ending March 31, 1908, exports were made as follows:—

| Countries.         | Tons. | Value.  | Countries.         | Tons.  | Value.    |
|--------------------|-------|---------|--------------------|--------|-----------|
|                    |       | \$      |                    |        | \$        |
| Great Britain..... | 5,347 | 237,152 | Italy.....         | 814    | 21,678    |
| Belgium.....       | 3,372 | 86,871  | Japan.....         | 97     | 3,177     |
| France.....        | 2,332 | 50,612  | United States..... | 46,846 | 1,322,890 |
| Germany.....       | 225   | 8,195   | Total.....         | 59,033 | 1,730,575 |

Exports to Great Britain, United States, Germany and other countries during the past six calendar years

are shown in Table 4, and total exports each year since 1892 in Table 5.

ASBESTOS.—TABLE 3.  
Annual Production since 1880.

| Calendar Year. | ASBESTOS.   |           |          | ASBESTIC.   |        |          |
|----------------|-------------|-----------|----------|-------------|--------|----------|
|                | Short Tons. | Value.    | Per ton. | Short Tons. | Value. | Per ton. |
|                |             | \$        | \$ cts.  |             | \$     | \$ cts.  |
| 1880 (a)       | 380         | 24,700    | 65 00    |             |        |          |
| 1881 (a)       | 540         | 35,100    | 65 00    |             |        |          |
| 1882 (a)       | 810         | 52,650    | 65 00    |             |        |          |
| 1883 (a)       | 955         | 68,750    | 71 99    |             |        |          |
| 1884 (a)       | 1,141       | 75,097    | 65 82    |             |        |          |
| 1885 (a)       | 2,440       | 142,441   | 58 38    |             |        |          |
| 1886 (a)       | 3,458       | 206,251   | 59 64    |             |        |          |
| 1887           | 4,619       | 226,976   | 48 92    |             |        |          |
| 1888           | 4,404       | 255,007   | 57 90    |             |        |          |
| 1889           | 6,113       | 426,554   | 69 78    |             |        |          |
| 1890           | 9,860       | 1,260,240 | 127 81   |             |        |          |
| 1891           | 9,279       | 999,878   | 107 76   |             |        |          |
| 1892           | 6,082       | 390,462   | 64 20    |             |        |          |
| 1893           | 6,331       | 310,156   | 86 81    |             |        |          |
| 1894           | 7,630       | 420,825   | 55 15    |             |        |          |
| 1895           | 8,756       | 368,175   | 42 05    |             |        |          |
| 1896           | 10,892      | 423,066   | 38 84    | 1,358       | 6,790  | 5 00     |
| 1897           | 13,202      | 399,523   | 29 99    | 17,240      | 45,840 | 2 66     |
| 1898           | 16,124      | 475,131   | 29 47    | 7,661       | 16,066 | 2 10     |
| 1899           | 17,790      | 468,655   | 26 34    | 7,746       | 17,214 | 2 22     |
| 1900           | 21,621      | 729,886   | 33 73    | 7,520       | 18,545 | 2 47     |
| 1901           | 32,892      | 1,248,645 | 37 96    | 7,325       | 11,114 | 1 52     |
| 1902           | 30,219      | 1,126,683 | 37 28    | 10,197      | 21,631 | 2 20     |
| 1903           | 31,129      | 915,888   | 29 42    | 10,543      | 13,869 | 1 31     |
| 1904           | 35,611      | 1,213,502 | 34 08    | 12,854      | 12,850 | 1 00     |
| 1905           | 50,669      | 1,486,359 | 29 33    | 17,594      | 16,900 | 0 96     |
| 1906           | 60,761      | 2,036,428 | 33 52    | 21,424      | 23,715 | 1 11     |
| 1907           | 62,139      | 2,484,767 | 39 99    | 28,296      | 20,275 | 0 72     |
| 1908           | 66,518      | 2,555,361 | 38 40    | 24,225      | 17,974 | 0 74     |

(a) Figures of export taken as production.

ASBESTOS.—TABLE 4.  
Exports of Canadian Asbestos by Countries 1903-1908.

| Calendar Year. | TO GREAT BRITAIN. |         | TO UNITED STATES. |           | TO GERMANY. |         | TO OTHER COUNTRIES. |         | TOTAL EXPORTS. |           | Average per ton. |
|----------------|-------------------|---------|-------------------|-----------|-------------|---------|---------------------|---------|----------------|-----------|------------------|
|                | Tons.             | Value.  | Tons.             | Value.    | Tons.       | Value.  | Tons.               | Value.  | Tons.          | Value.    |                  |
|                |                   | \$      |                   | \$        |             | \$      |                     | \$      |                | \$        |                  |
| 1903.          | 2,743             | 40,120  | 24,252            | 714,781   | 1,429       | 25,150  | 3,356               | 110,982 | 31,780         | 891,033   | 28 04            |
| 1904.          | 6,602             | 210,175 | 25,957            | 762,300   | 2,463       | 94,141  | 2,250               | 94,271  | 37,272         | 1,160,887 | 31 15            |
| 1905.          | 9,731             | 305,056 | 29,696            | 811,080   | 2,969       | 100,061 | 4,635               | 169,918 | 47,031         | 1,386,115 | 29 47            |
| 1906.          | 9,435             | 318,313 | 39,767            | 1,058,513 | 3,654       | 82,117  | 6,998               | 230,314 | 59,854         | 1,689,257 | 28 22            |
| 1907.          | 5,432             | 200,909 | 44,861            | 1,312,582 | 225         | 8,195   | 6,235               | 147,613 | 56,753         | 1,669,299 | 29 41            |
| 1908.          | 5,221             | 288,290 | 50,503            | 1,314,337 | 341         | 9,470   | 5,145               | 230,666 | 61,210         | 1,842,763 | 30 11            |

ASBESTOS.—TABLE 5.  
Annual Exports, Calendar Years 1892-1908.

| Calendar Year. | Tons.  | Value.  | Value per ton. | Calendar Year. | Tons.  | Value.    | Value per ton. |
|----------------|--------|---------|----------------|----------------|--------|-----------|----------------|
|                |        | \$      | \$ cts.        |                |        | \$        | \$ cts.        |
| 1892           | 5,380  | 373,103 | 69 35          | 1901           | 32,269 | 1,069,918 | 33 16          |
| 1893           | 5,917  | 338,707 | 57 24          | 1902           | 31,074 | 995,071   | 32 02          |
| 1894           | 7,987  | 477,837 | 59 82          | 1903           | 31,780 | 891,033   | 28 04          |
| 1895           | 7,442  | 421,690 | 56 66          | 1904           | 37,272 | 1,160,887 | 31 14          |
| 1896           | 11,842 | 567,967 | 47 96          | 1905           | 47,031 | 1,386,115 | 29 47          |
| 1897           | 15,570 | 473,274 | 30 40          | 1906           | 59,854 | 1,689,257 | 28 22          |
| 1898           | 15,346 | 494,012 | 32 19          | 1907           | 56,753 | 1,669,299 | 29 41          |
| 1899           | 17,883 | 473,148 | 26 46          | 1908           | 61,210 | 1,842,763 | 30 11          |
| 1900           | 16,993 | 693,105 | 39 61          |                |        |           |                |



Although the chief source for the raw material, Canada does not as yet manufacture all the asbestos goods required for home consumption. There is, therefore, a considerable importation of asbestos goods under the

import classification "Asbestos in any form other than crude and all manufactures of," the duty being 25 per cent. The annual value of the imports is shown in Table 6.

ASBESTOS.—TABLE 6.  
Imports Fiscal Years 1885-1908.

| Fiscal Year. | Value. | Fiscal Year. | Value. | Fiscal Year.       | Value.  |
|--------------|--------|--------------|--------|--------------------|---------|
|              | \$     |              | \$     |                    | \$      |
| 1885.....    | 674    | 1893.....    | 19,181 | 1901.....          | 50,829  |
| 1886. ....   | 6,831  | 1894. ....   | 20,021 | 1902.....          | 52,464  |
| 1887.....    | 7,836  | 1895.....    | 26,094 | 1903.....          | 75,465  |
| 1888.....    | 8,793  | 1896.....    | 23,900 | 1904.....          | 83,827  |
| 1889.....    | 9,943  | 1897.....    | 19,032 | 1905.....          | 116,836 |
| 1890.....    | 13,250 | 1898.....    | 26,389 | 1906.....          | 137,974 |
| 1891.....    | 13,298 | 1899.....    | 32,607 | 1907 (9 months) .. | 127,509 |
| 1892.....    | 14,090 | 1900.....    | 43,455 | *1908.....         | 190,980 |

\* Asbestos in any form other than crude, and all manufactures of. Duty 25 per cent.

Outside of Canada the chief asbestos producing country is Russia, whose output in 1907 is reported as 9,356 metric tons. The United States, Cape Colony and

Cyprus are also producers, though the quantity is not important.

Table 7 shows the principal productions since 1902.

ASBESTOS.—TABLE 7.  
World's Production 1902-1908 in Metric Tons, (2204.6 lbs.):

|                        | 1902.  | 1903.   | 1904.  | 1905.  | 1906.  | 1907.     | 1908.  |
|------------------------|--------|---------|--------|--------|--------|-----------|--------|
| Canada (b).....        | 27,414 | 28,240  | 32,306 | 45,967 | 55,122 | 56,364    | 60,372 |
| United States (c)..... | 912    | 805     | 1,343  | 2,820  | 1,538  | 592       | 849    |
| Russia (e).....        | 4,507  | 5,624   | 7,502  | 7,266  | 9,201  | (a) 9,356 | *      |
| Cape Colony (e) ...    | (g) 41 | (g) 276 | 373    | 454    | 473    | 548       | *      |
| Cyprus (e).....        | .....  | .....   | .....  | .....  | (g) 19 | (g) 89    | *      |

\* Figures not available.

(a) Provisional.

(b) Mines Branch, Ottawa.

(c) Home Office, London.

(g) Exported.

(c) United States, Geological Survey.

The following is a list of the principal producing companies in Canada:—

#### List of Operators.

Dominion Asbestos Co., Ltd., Montreal, 415 Merchants Bank building.

Standard Asbestos Co., Ltd., Montreal, 415 Merchants Bank building.

Union Asbestos Mines, Calmon, Que.

Johnston's Asbestos Co., Ltd., Thetford Mines, Que.

Bell Asbestos Mines, Thetford Mines, Que.

Beaver Asbestos Co., Thetford Mines, Que.

King Asbestos Mines, Thetford Mines, Que.

The Asbestos and Asbestic Co., Ltd., Asbestos, Que.

Broughton Asbestos Fibre Co., East Broughton Sta., Que.

The Quebec Asbestos Co., Sherbrooke, Que.

Eastern Townships Asbestos Co., East Broughton Sta., Que.

British Canadian Asbestos Co., Ltd., Black Lake, Que.

#### Companies Prospecting or Expecting to Operate.

Megantic Mining Co., Montreal, 88 McGill St.

W. H. Lambly, Inverness, Que.

Brompton Lake Asbestos Co., Montreal, 17 Victoria Square.

The Asbestos Mining & Manufacturing Co., Sherbrooke, Que.

Boston Asbestos Co., Ltd., East Broughton Sta., Que.

Robertson Asbestos Mining Co., Drummondville, Que.

The Ling Asbestos Co., East Broughton Sta., Que.

The Thetford Asbestos & Exploration Co., Thetford, Que.

The Imperial Asbestos Co., Montreal, Que.

La Sompagnie d'Amiante Champlain, Quebec, 81 Rue St. Pierre.

**The Engineering and Mining Journal, November 20, 1909.**—Kenneth S. Gunterman contributes an article entitled "Mining Coal in Southern Colorado" to this number. He describes the mine and plant of the Carbon Coal and Coke Company. The coal mined is a good coking fuel, but high in ash—23 per cent. It, therefore, requires washing. The seams worked are from 3 feet to 7 feet thick. Much bone coal is encountered.

The double-entry, room-and-pillar method of mining is practised. Over 90 per cent. of the coal is recovered in mining. The coal is crushed, washed, and delivered to bee-hive ovens. Four Covington coke-drawing machines are in commission. Each pulls 48 ovens per shift. The coke yield is over 72 per cent. This heavy yield is largely attributable to the use of the coke-drawing machines.

# EIGHTEENTH ANNUAL REPORT OF THE ONTARIO BUREAU OF MINES, 1909

[Editor's Note.—The Eighteenth Annual Report of the Ontario Bureau of Mines has made its belated appearance. We are informed—and because of our own sufferings we readily accept the explanation—that the unspeakable printer is solely to blame. This being the case, it is surely possible for the Bureau to expedite matters by issuing the report in separate sections. Not only would this give the public the benefit of more timely service, but it would induce greater interest in each of the various special papers that make up the volume. For instance, the Statistical Review, an admirable piece of work, would lose nothing by being published as a separate. We hope that the Bureau will see its way clear to act upon this hint.]

The Eighteenth Report presents the usual summary review of the mining industry of the Province, along with a continuation of the series of reports on the iron ranges of northern and northwestern Ontario. Dr. A. P. Coleman, Dr. E. S. Moore, and Mr. R. C. Allen are the writers. Mr. M. B. Baker gives an account of his exploration of the region adjacent to Lake Abitibi, and, lastly, Dr. A. P. Coleman describes Lake Ojibway, the Last of the Great Glacial Lakes, and outlines his views on the Classification and Nomenclature of the Drift of Ontario.

Space permits notice only of the first section, the Statistical Review, by Deputy Minister Thos. W. Gibson.

## Statistical Review—Abstract of Mr. T. W. Gibson's Annual Resume.

The mineral output of Ontario in 1908 is valued by the Bureau at \$25,637,617, as compared with \$25,019,373 in 1907. The low price of silver affected not only the value but the output of that metal. The metallic products, principally silver, pig iron, nickel, and copper, furnished 65 per cent. of the total value, the non-metallic substances 35 per cent. Of the latter the most important were Portland cement, bricks, natural gas, petroleum, stone, salt, and lime, in the order named. For the first time the value of the natural gas produced was greater than that of petroleum, the former being nearly one million dollars, while the latter was but little over seven hundred thousand dollars. The production of the former is steadily increasing, and of the latter declining.

The itemized tabular statement of mineral production has already appeared in the Canadian Mining Journal. It may, therefore, be omitted here. A few remarks upon certain fluctuations will be all that is necessary.

Of the metallic products, silver was by far the most important, the output being 19,444,400 ounces, valued at \$9,136,830. This is an increase in value over 1907, of \$2,978,959. Next in value comes pig iron, \$490,839, followed by nickel, \$1,866,059, and copper, \$1,071,140. Gold stands at the modest figure of \$60,337.

Cement, valued at \$2,417,769; brick, \$1,575,875; natural gas, \$988,616, and petroleum, \$703,773, are the outstanding items in non-metallic production.

The metallic mineral production was responsible for the employment of 6,834 men, who were paid a total of \$4,770,044 in wages. The corresponding figures for the

non-metallic mineral industries are 8,355 men, and \$3,088,223 wages. The relatively small figure for total wages in this latter instance is mainly due, no doubt to the fact that many of the non-metallic mineral industries furnish employment only for part of the year.

**Basis of Statistical Values.**—Mr. Gibson again draws attention to the divergent methods employed by the mining department of the Dominion Government and the several Provinces. The Mines Branch, Ottawa, gives the Ontario production of nickel as 9,572 tons. The Bureau places it at 10,175 tons. In the former case the yield from the Cobalt region is not included; in the latter it is. Yet the Mines Branch values the 1908 nickel output at \$8,231,538; while the Bureau's valuation is only \$1,866,059. The explanation lies in the fact that the Mines Branch values the nickel contents of the mattes produced by the Sudbury smelters at the average price of refined nickel in New York; while the Bureau's figures represent the value of the nickel in the form of matte at the point of production, as given by the producers. Conflicting methods also obtain as regards pig iron.

Moreover, as the Mines Branch gives the figures for Canada only, and not for the individual Provinces, inspection of these figures, so far as the metalliferous products of Ontario are concerned, would lead to a mistaken idea of Ontario's position, especially as all of the nickel and nearly all of the silver produced in the Dominion come from this Province. It may be noted, also, that the Mines Branch values the non-metallic products at the mine or point of shipment.

Applying the methods used by the Mines Branch, the value of the metallic products of Ontario for 1908 would be \$22,330,062, instead of \$16,754,986. The total value of mineral production would therefore, amount to \$31,212,693, or \$6,193,320 more than the Bureau's returns indicate.

## Gold.

The number of companies producing gold last year was seven. These were Imperial Gold Mines (Laurentian mine,) Lepage Gold Mining Company (Grace mine, Michipicoten), Grace Mining Company (Eagle Lake), Cleveland Gold Mining Company, Empire Mining and Milling Company, Crystal Gold Mining and Milling Company, and the Golden Reed Mining Company. Most of these carried on operations intermittently and on a small scale, the principal producers being the Imperial, Lepage, and Cleveland companies. The total production of bullion was 3,465 ounces valued at \$60,337.

Interest in the gold districts of Sturgeon Lake and Lower Seine River was stimulated by promising finds in both places, the discoveries in the latter being at Glenorchy, about 40 miles east of Fort Frances, near many gold properties which were actively worked ten or twelve years ago, but have since been abandoned. All the eastern Ontario mines were idle, and of the Larder Lake companies none are yet steadily milling ore.

## Silver.

Though Cobalt is not the only, it is the chief, source of silver in Ontario at the present time, the mines of that



region producing an overwhelming proportion of the total yield. Other contributions were from the Port Arthur district, where one or two silver mines were operated during the year, and from the bullion produced at some of the gold mines. The total yield was 19,444,400 ounces, of which the mines of Cobalt produced 19,437,875 ounces, being an increase over the output in 1907 of 94 per cent. Ontario is now third in rank among the silver producing communities of the world, Mexico heading the list, and the United States coming second. The world's production in 1908 is placed at 183,800,000 ounces, so that Ontario's share of the output was about 11 per cent.

The course of prices for silver during the year was unsatisfactory. In New York the average in January per fine ounce was 55.678 cents; it rose in February to 56 cents, then fell steadily until August, when the average was 51.683 cents. September saw a slight rally to 51.720 cents, but a further decline set in, and the year closed with an average for December of 48.769 cents, the average for the twelve months being 52.864 cents per ounce. Notwithstanding the fall in price, the margin of profit is still large, some of the Cobalt mines that have published their cost sheets alleging their ability to produce silver at 7½ to 20.7 cents per ounce.

**The Producing Mines.**—There were thirty producing mines at Cobalt in 1908, the following list giving their names in the order of production: Nipissing, O'Brien, La Rose, Crown Reserve, Kerr Lake, Coniagas, Temiskaming and Hudson Bay, Temiskaming, Buffalo, Drummond, Trethewey, McKinley-Darragh-Savage, Cobalt Silver Queen, City of Cobalt, Standard Cobalt, Right of Way, Silver Leaf, King Edward, Cobalt Townsite, Nova Scotia. Other shippers were Foster Cobalt, Silver Cliff, Chambers-Ferland, Cobalt Lake, Peterson Lake, Nancy Helen, Provincial, Keeley, Colonial, Casey Cobalt. The most notable addition to the productive mines during the year was the Crown Reserve. This mine was opened up on that part of the bed of Kerr Lake sold by tender by the Government of the Province in January, 1907, the price paid being \$178,500 together with a royalty of 10 per cent. on the value of the output at the pit's mouth. A large vein, rich even for Cobalt, was struck during development work, and the Crown Reserve was a heavy shipper of high-grade ore during the year.

The quantity of ore and concentrates shipped out of the Cobalt camp in 1908 was 25,624 tons. Of this 24,487 tons was ore and 1,137 tons concentrates. The ore averaged 736 ounces per ton, and the concentrates 1,244 ounces. Only the poorer classes of ore, such as will not pay to ship, are subjected to concentration. This is evident from the fact that in order to obtain 1,185 tons of concentrates—the total production—50,997 tons of ore and rock were put through the concentrating plants, being in the proportion of 43 tons of ore to one ton of concentrates. The silver recovered was about 28 ounces per ton of material treated, but the loss in the tailings would raise the average contents of the rock a little above this point.

As in former years, the bulk of the ore, so far as tonnage is concerned, was exported to the United States, where there is a demand, particularly from the smelters of Denver, Colorado, for the silicious low-grade ores of Cobalt for mixture with the sulphide concentrates resulting from the mill treatment of the gold and silver ores of Cripple Creek and Creede. Some

shipments to the United States were of high grade, but the gross value of the ores treated in Canadian smelters was almost three times the value of those exported. The value per ton of the shipments to the United States was about \$120, while that of the ores refined at home was about \$825. The distribution of the output of the Cobalt mines for 1908 is given by the T. & N. O. Railway Commission as follows:—

|                     | Tons.     | Per cent. |
|---------------------|-----------|-----------|
| Canada .....        | 7,401.14  | 29.18     |
| Great Britain ..... | 222.08    | .88       |
| Germany .....       | 229.46    | 1.18      |
| United States ..... | 17,439.42 | 68.76     |

The total value of the output of silver from the beginning of mining operations in the Cobalt camp to the end of 1908 amounts to \$20,428,710. This was yielded by 46,912 tons of ore, aggregating 36,105,788 ounces and averaging 769 ounces; and 1,137 tons of concentrates, aggregating 1,415,395 ounces, and averaging 1,244 per ton. The average silver content per ton of ore for the five years of operation is:—

|           |              |
|-----------|--------------|
| 1904..... | 1,309 ounces |
| 1905..... | 1,143 “      |
| 1906..... | 1,013 “      |
| 1907..... | 677 “        |
| 1908..... | 736 “        |

**Total Silver Production of Ontario.**—An attempt has been made to ascertain the entire yield of silver in Ontario up to the present time. The statistics of production while the Silver Islet mine, and later the mines on the mainland in the Port Arthur region, were being worked, were not officially collected, and it is difficult now to reconstruct them with exactness, as the figures of the output of individual properties given or referred to in the reports of the Geological Survey of Canada and the Bureau of Mines are incomplete, and in some instances contradictory.

The greater part of the silver so far obtained in the Lake Superior region has come from the Silver Islet mine. This deposit was discovered in 1868, and operations were begun in September, 1870, finally ceasing in 1884. The output is valued by different authorities at sums varying from \$3,000,000 up to \$4,500,000. Mr. E. D. Ingall tabulates the production year by year, showing it to have had a total value of \$3,047,532.04, but adopts the statement of Mr. Richard Trethewey, superintendent of the mine when it closed, that the total value of silver produced from the commencement to the close of operations was \$3,250,000. Mr. A. Blue, late Director of the Bureau of Mines, says the mine “yielded in all from first to last \$3,500,000.”

From several gentlemen, interested in mining, whose experience and recollection cover the productive periods of the Lake Superior silver region, and who had good opportunities of learning the facts, figures of production from the mines on the mainland have been obtained, differing as to individual properties, but agreeing closely in the total. Statement No. 1 is furnished by Mr. W. A. Preston, M.P.P.; statement No. 2 by Mr. F. S. Wiley:—

#### Statement No. 1.

|                                          |           |
|------------------------------------------|-----------|
| Beaver mine .....                        | \$550,000 |
| Silver Mountain, East and West End ..... | 500,000   |
| Badger and Porcupine .....               | 300,000   |
| Rabbit Mountain .....                    | 50,000    |
| Thunder Bay mine .....                   | 20,000    |
| Shuniah mine .....                       | 50,000    |



|                            |             |
|----------------------------|-------------|
| 3 A and Beck mine.....     | 10,000      |
| Jarvis Mining Company..... | 40,000      |
| Total .....                | \$1,520,000 |

**Statement No. 2.**

|                                |             |
|--------------------------------|-------------|
| Beaver mine .....              | \$700,000   |
| Silver Mountain, East End..... | 30,000      |
| Silver Mountain, West End..... | 300,000     |
| Badger and Porcupine .....     | 500,000     |
| Other properties .....         | 50,000      |
| Total .....                    | \$1,580,000 |

The price of silver from 1882 to 1890, when the bulk of the production from these mines was made, fell from \$1.136 per ounce in the former year to \$0.935 in 1889 and to \$1.046 in 1890. The average during the period would be about \$1.035 per ounce. Applying this price to the smaller of the above estimates, we have 1,468,599 ounces as the quantity obtained up to the closing of the mines in 1893. One or two of the Lake Superior mines, notably Silver Mountain West End, have been worked in a more or less desultory way since that time, beginning in 1898, the output from 1898 to 1903, according to returns made to the Bureau of Mines, being 617,433 ounces valued at \$365,681.

We can now sum up as follows:—

|                                                            | Oz. silver. | Value.       |
|------------------------------------------------------------|-------------|--------------|
| Silver Islet mine.....                                     | 2,662,509   | \$3,250,000  |
| Mainland group, to 1893.....                               | 1,468,599   | 1,520,000    |
| Mainland group, 1894 to 1903<br>inc.....                   | 617,433     | 365,681      |
| Production previous to opening<br>of Cobalt mines.....     | 4,748,541   | \$5,135,681  |
| Production subsequent to open-<br>ing of Cobalt mines..... | 37,586,970  | 20,468,751   |
| Total production to 31st<br>December, 1908 .....           | 42,335,511  | \$25,604,432 |

**Refining Plants and Concentrators.**—There were three reduction plants in Ontario treating ore from the mines of Cobalt last year, namely, those of the Canadian Copper Company at Copper Cliff, the Deloro Mining and Reduction Company at Deloro, and the Coniagas Reduction Company at Thorold. Through these works there were passed an aggregate of 6,958 tons of ore containing 11,658,008 ounces of silver, of which 8,972,958 fine ounces were recovered, the remainder, 2,685,050 ounces, being contained in the speiss product reserved or exported for further treatment. This does not include the operations of the Nipissing Reduction Company or the Muggley Concentrators, Limited, at Cobalt, which carried on a concentrating business only, shipping the product to smelters for refining. The number of workmen employed at these various plants was 247, and the wages paid \$172,675.

The following companies have installed concentrating mills which were in operation during the year: Buffalo Mines Company, Coniagas Mines, Standard Cobalt Mines, King Edward Cobalt mines; and in addition to these there were custom plants owned and operated by the Northern Customs Concentrators (formerly Muggley Concentrators), and the Nipissing Reduction Company. There were also under construction concentrating mills at the Colonial, McKinley-Darragh-Savage, Nova Scotia and O'Brien mines.

**Ore Purchasers.**—Ore purchasers were somewhat

more numerous in 1908 than in 1907. The American Smelting and Refining Company, New York, bought numerous consignments both for its Perth Amboy, N.J., and Denver, Col., works; the Pennsylvania Smelting Company of Pittsburg, Penn., whose plant is at Carnegie, Penn., also bought considerable ore, while the Balbach Smelting and Refining Company of Newark, N.J., and the United States Metal and Refining Company of Chrome, N.J., were occasionally in the market for high grade material. The Canadian Copper Company, Copper Cliff, Ontario, bought a large part of the high grade output of the camp. The Deloro Mining and Reduction Company, of Deloro, Ontario, while running mainly on the more valuable ores of the O'Brien mine, also bought and treated high class ores from other properties. The Coniagas Reduction Company at Thorold, Ontario, confined itself to the ores and concentrates of the Coniagas mine. The consolidated Mining and Smelting Company of Trail, B.C., took a few carloads. Beer, Sondheimer Company of Hamburg, Germany, purchased several lots of rich ore, and the Anglo-French Nickel Company of Swansea, Wales, a few consignments of silver-free cobalt ore.

**Arsenic, Nickel, Cobalt.**—The elements other than silver in the ores of the Cobalt camp are at present of comparatively little value, at any rate to the miners of the ore. Arsenic is no longer paid for by ore-buyers, and nickel is regarded as an impurity warranting the imposition of a penalty if in excess of the cobalt contents.

Cobalt itself is also much less valuable since the mines of this district were opened. The world's demand for cobalt oxide is in the neighbourhood of 275 or 300 (short) tons per annum, while the product of the Cobalt mines, if all converted into oxide, would amount to upwards of 1,500 tons per annum. In 1907 the ruling rate was \$2.50 per pound, but successive reductions have brought the price down to about a dollar per pound, with prospect of a still lower level. In such circumstances it was but natural that the value of cobalt in the ore should also fall, and as a matter of fact for the greater part of the cobalt contained in the ore shipments of 1908, the mine-owners received nothing at all. Even for silver-free cobalt ore the price has been reduced, and now ranges from 25 to 45 cents per pound, according to the proportion of the cobalt contents upwards from eight per cent.

**Labour Employed.**—The number of men employed in the silver mines of Cobalt, including all those engaged in the works for the reduction of the ores at Copper Cliff, Deloro and Thorold was 2,414, and the amount paid out in wages \$2,159,055. Of these 1,039 were underground workers and 1,325 above ground.

There were no labour strikes or troubles in Cobalt during 1908.

**Dividend-Paying Mines.**—Cobalt has given rise to a vast number of mushroom mining companies, so-called, whose operations were for the most part carried on in the advertising columns of the city newspapers rather than among the rocks of the mining field itself; yet the amount paid out as dividends or profits to the shareholders of the producing companies has not only been very large in itself, but as compared with the value of the output has represented an unusual degree of profit. Fifteen companies have paid out as dividends \$8,313,461.54, and the list does not include the O'Brien and Drummond mines, the former of which is a partnership concern, and the latter a close corporation. Reckoning these two among the dividend-payers,



it will be found that the total returns or profits divided have been very little if at all short of \$10,000,000. The aggregate value of the production of the Cobalt camp has been \$20,962,942. Of this, as the table shows, almost fifty per cent. has been paid out as dividends.

**New Silver Fields.**—The search for other Cobalts has led to the discovery of silver in South Lorrain and in several districts in the valley of Montreal River and its branches. The broad geological features of the Cobalt area are repeated in these various regions, though there are somewhat marked differences in the relationships of the silver-bearing veins to the rock formation in the new fields as compared with the original one. In South Lorrain several promising properties are under development and in the Elk Lake, Miller Lake and Gowganda districts the discoveries been such as to warrant the hope that the deposits will prove remunerative.

In no case, however, has development proceeded sufficiently far to enable a positive statement to be made. In Gowganda the finds of native silver on the surface of the veins have been of remarkable quality, but on the whole the silver occurrences seem to be more irregular and of smaller proportions than those which have given Cobalt its pre-eminence among the silver camps of the world.

It is to be remembered, however, that the Cobalt deposits, though a natural, hardly constitute a fair standard of comparison. The fact is, that had Cobalt remained undiscovered, the new finds at Elk Lake, Miller Lake and Gowganda would have been regarded as phenomenal. The minerals found are those of Cobalt—silver, smaltite and niccolite.

**Nickel.**—The mattes produced from the nickel-copper ores of the Sudbury region in 1908 contained 9,563 tons of nickel, while in the ores raised in the cobalt-silver mines, it is estimated there were 612 tons of nickel. The total quantity of nickel raised in the Province last year was therefore 10,175 tons, though a money value is given only to the Sudbury product, that from Cobalt being a negligible quantity in this respect, and for a large part probably never entering into consumption in the arts. The aggregate yield of nickel was 797 tons less, and the output of the Sudbury deposits 1,039 tons, less than in 1907. The smaller production was due to the slackening of operations in the Sudbury field, the general depression in business leading to a falling-off in the demand. The value placed upon the nickel contents of the Sudbury mattes by the producers was \$1,866,059.

The Canadian Copper Company carries on mining and smelting on an extensive scale, and makes the larger part of the matte product. Last year it extracted from the Creighton mine 222,497 tons of ore, and from the Crean Hill 118,066 tons. The deposits at Copper Cliff, Stobie and other mines were not drawn upon. This company has a modern and very efficient plant, its smelters being situated at Copper Cliff.

The Mond Nickel Company's mines are situated in Denison and Garson townships, and its works at Victoria Mines, in the former. Like the Canadian Copper Company, it produces Bessemer matte of say 80 per cent. metallic contents, which is exported to Clydach, Wales, for refining by the Mond nickel carbonyl process. In 1908 the Mond Company raised 39,189 tons of ore from Victoria No. 1 mine, and 29,799 tons from the Garson mine.

The Dominion Nickel Copper Company, formed to exploit some large nickel ore deposits in the northern range, has not yet begun operations in the field.

**A New Nickel Area.**—An interesting and possibly important discovery was made during the year 1908, being of a deposit of pyrrhotite carrying nickel in apparently workable, even high proportions, outside of the recognized nickel-bearing areas of the Province. Hitherto, all known nickel bodies of economic consequence have been confined to the Sudbury field, and while occurrences of nickeliferous pyrrhotite have been noted in other parts of Ontario, they have invariably proven to be too low in nickel to be classed as ore. In the township of Dundonald, near the boundary of Clergue, on lot 1, concession three, a prospector named Alexander Kelso staked out several claims on a body of pyrrhotite carrying as high as 11.46 per cent.

There has been again a reduction in the valuation placed upon nickel contents of the Bessemer matte produced by the mining companies. In 1906 the value was estimated at an average of 17.8 cents per pound, in 1907, 10.7 cents per pound, and last year it fell to 9.75 cents per pound. The quotations for refined nickel in 1908 in New York averaged about 43 cents per pound, as against 45 cents per pound in 1907.

In the smelting of the ore into matte the consumption of coke at the nickel works was 64,868 tons valued at \$485,219, and the quantity of wood required for roasting the ore was 29,467 cords worth \$89,121. For the most part the machinery in the mines and smelting plants is now operated by electrical energy, generated by the Canadian Copper Company at High Falls, Spanish River, and by the Mond Nickel Company at Wabageshik Falls on the Vermilion. There is undoubtedly some loss of the metals in roasting and smelting the ores, but without making allowance for such losses, the ore put through the furnaces last year contained 2.65 per cent. of nickel and 2.08 per cent. of copper as compared with 2.95 per cent. nickel and 1.95 per cent. copper in 1907.

**Copper.**—The nickel-copper ores of Sudbury constitute the main source of the copper obtained in Ontario, and these deposits being worked primarily for their nickel contents, the production of copper from year to year depends more upon the demand for nickel than for copper itself. Consequently, the low level of copper prices during the past year—the average in the New York markets being 13,208 cents per pound, as compared with 20,004 cents per pound in 1907,—had little effect upon the output of the metal in this Province. In fact, the production of 1908 was greater than that of 1907. This was in part due to the higher average copper contents of the ores smelted in the Sudbury furnaces as compared with the previous year; but the increase in the copper output would have been still greater had prices ruled high, for the non-nickeliferous copper deposits of the north shore of Lake Huron and elsewhere were for the most part allowed to remain unworked during 1908. Practically, only one of these mines, the Hermina, raised any ore at all last year. The total production of copper was 7,561 tons, worth \$1,071,140, of which all but 60 tons was taken from the nickel-copper ores of the Sudbury field.

**Iron Ores.**—There were four iron mines from which ore was raised and shipped last year, namely, the Helen mine, Moose Mountain, Mineral Range and Wilbur. The first two are in northern, the last two in eastern Ontario. The total output was 216,177 tons valued at \$574,839, as compared with 205,295 tons worth \$482,



532 in 1907, an increase of 10,882 tons in weight and \$92,307 in value. Of the shipments, 166,231 tons was hematite and 49,946 tons magnetite.

**Pig Iron and Steel.**—Of the seven blast furnaces in the Province, five were in full campaign during 1908, namely, two belonging to the Algoma Steel Company, Sault Ste. Marie, two to the Hamilton Steel and Iron Company at Hamilton, and one to the Canada Iron Furnace Company at Midland; one, that of the Deseronto Iron Company at Deseronto, was in operation for a brief space only, while one, the property of the Atikokan Iron Company at Port Arthur, was idle throughout the year. The total production of pig iron was 271,656 tons valued at \$4,390,839, a falling off of 14,560 tons in weight and \$326,018 in value as compared with 1907. Steel rails to the extent of 126,775 tons, worth \$3,353,078, were made by the Algoma Steel and Iron Company and the Ontario Iron and Steel Company, Welland, amounting to 45,333 tons and valued at \$1,044,004.

The Electro-Metals Company, Welland, is operating a plant for the manufacture of ferro-silicon and other ferro compounds.

Mr. J. W. Evans M.E., of Belleville, who has for some time been experimenting in the production of steel from iron ore by the electric process, writes that in September, 1905, he obtained the first steel made directly from Canadian ores in the electric furnace. This was in the form of steel buttons made in a crucible. Since that time he had produced mild steel of good quality from Coc Hill ore, containing 68.01 per cent. of iron and 1.01 per cent. of sulphur, and from Bowen mine ore carrying 45.17 per cent. of iron and 7.44 per cent. of titanium. At the date of his letter, 7th June, 1909, Mr. Evans was using ore from the Orton mine, which assayed 52 per cent. of iron, 8 per cent. of titanium and a small amount of nickel, and in one and a half hours from the time the ore was placed in the furnace he obtained steel bars weighing over two pounds. The steel from Coc Hill ore contained from a trace to .04 per cent. of silicon, .08 to .17 per cent. of sulphur and .05 to .07 per cent. of carbon; from Bowen mine ore, silicon .05 to 2.31 per cent., titanium none to 1.02 per cent. and carbon .51 to .87 per cent. Mr. Evans remarks that in order to retain the titanium in the steel he had to reduce the proportion of lime in charge, which raised the amount of silicon. In his furnaces he employed a combination of the reflected arc and immersed electrodes as being more economical of electrical energy.

Following are details of the operations at the blast furnaces and steel works during 1908:

|                             |      |           |
|-----------------------------|------|-----------|
| Ontario ore smelted .....   | tons | 170,215   |
| Foreign ore smelted .....   | tons | 342,747   |
| Scale and mill cinder ..... | tons | 12,523    |
| Limestone for flux .....    | tons | 179,741   |
| Coke for fuel .....         | tons | 322,817   |
| Value of do .....           | \$   | 1,479,083 |
| Pig iron product .....      | tons | 271,656   |
| Value of do .....           | \$   | 4,390,839 |
| Steel product .....         | tons | 172,108   |
| Value of do .....           | \$   | 4,397,082 |
| Workmen employed .....      | No.  | 1,807     |
| Wages paid .....            | \$   | 1,001,893 |

The proportion of domestic ore charged into the blast furnaces rose from 23.6 per cent. in 1907 to 33.1 per cent. in 1908. Much the larger part of the ore raised from the mines of Ontario last year was shipped to furnaces in the Province although it was not all smelted within the year.

The record of the pig iron and steel manufacturing industry of Ontario during the last year is shown in the following table:

|                           |       |           |
|---------------------------|-------|-----------|
| Ontario ore smelted ..... | tons  | 170,215   |
| Foreign ore smelted ..... | tons  | 342,747   |
| Steel .....               | tons  | 172,108   |
| Coke .....                | tons  | 322,817   |
| Charcoal .....            | bush. | .....     |
| Pig iron .....            | tons  | 271,656   |
| Value of pig iron .....   | \$    | 4,390,839 |
| Steel .....               | tons  | 172,108   |
| Value of steel .....      | \$    | 4,397,082 |

**Arsenic.**—The arsenical deposits of Ontario are numerous and extensive. For the most part they consist of arsenopyrite, which as in the case of the ores of the county of Hastings, often carries values in gold. As a matter of fact, the only arsenic at present being made in Ontario is refined from the ores of the Cobalt camp, and is therefore, like a large proportion of the arsenic made throughout the world, in reality a bye-product.

There were obtained at the reduction works at Copper Cliff, Deloro and Thorold from silver-cobalt ores last year, a total of 702 tons of refined white arsenic, having a value of \$40,373, or say 2.87 cents per pound. In addition, it is estimated that there were 2,970 tons of arsenic contained in the ores which were exported for treatment. Doubtless a large proportion of this arsenic, if not the whole, is recovered in the various plants where the ores are refined, and eventually finds its way to market. The mine owners of Cobalt, however, get nothing for arsenic contents of their ores, and no figures of value are set opposite these exports of crude arsenic in the tables of production given in this report. In 1907 the quantity of white arsenic recovered was 348 1-2 tons, and the value as returned to the Bureau was \$40,104.

**Iron Pyrites.**—The iron pyrites industry of Ontario is developing. In 1905 the product of the mines was 7,325 tons, in 1907 15,755 tons, and in 1908 20,970 tons valued at \$69,980. The larger part of the output is shipped to the United States, but a considerable portion is utilized in the manufacture of sulphuric acid at Sulphide, Hastings County, where the Nickols Chemical Company have an extensive plant.

The producing companies in 1908 were the Northern Pyrites Company, the Nichols Chemical Company, the Northland Mining Company, and the Lake Superior Corporation. The first-named concern made a few trial shipments from their large pyrite bodies at Lake Minnitakie, having been afforded an outlet for their product by the completion of the branch line of the Grand Trunk Pacific Railway from Fort William. This company has made large preparations for business and expects to ship extensively to the American market in 1909. The Nichols Chemical Company's mine is at Sulphide in proximity to their acid works; the Lake Superior Corporation exported a small quantity of the granular pyrite found in the Helen iron mine at Michipicoten, and the Northland Mining Company has for some time been working a deposit near Rib Lake in the Temagami Forest Reserve.

The Lake Superior Corporation has large deposits of pyrite in the neighbourhood of Goudreau Lake, southwest of Missanabie on the Canadian Pacific Railway, which have not yet been worked, except for testing purposes.

**Mica.**—From the mica mines of the Province there were raised and shipped last year 368 tons of rough-cobbed amber mica the value of which was returned to



the Bureau as \$73,586. This is a decrease from 1907, when the output was 456 tons, worth \$82,929.

The principal producers were the Loughborough Mining Company, whose output is utilized by the General Electrical Company, and the Dominion Improvement and Development Company. The mines of the former are in the counties of Frontenac and Perth, and of the latter in the county of Perth.

**Salt.**—There is no rock salt mined in Ontario, the product being entirely the result of the evaporation of brine pumped up from the wells. These are situated on the shores of Lakes Huron and St. Clair, where immense deposits occur in the limestones of the Onondaga formation.

In 1908 the output of the wells was reported to the Bureau as 79,112 tons, valued at \$488,330, an increase over the product of 1907, when it was 62,806 tons, worth \$432,936. The chief operators were the Canadian Salt Company, with works at Windsor and Sandwich, and the Empire Salt Company of Sarnia.

**Petroleum.**—The petroleum wells of southwestern Ontario yielded in 1908, 18,479,547 Imperial gallons of crude oil, valued at \$703,773.

The falling-off as compared with the previous year was serious, being not less than 33 per cent. on the output of 1907. Part of the decrease may be explained by the gradual diminution in the yield of the wells of Lambton County field. The Petrolea and Oil Springs and Bothwell districts have been producing oil for upwards of forty years and the average production per well is now extremely small, being not over eight or nine gallons per day. It is only the large number of wells, and the economy in management which long experience has taught the operators, that enables Lambton County to be reckoned among the oil-producing regions to-day.

Scrutiny of the figures, showing the production of oil from the various districts, reveals the fact that the decline in yield of the more recent of the oil fields, namely, those in the County of Kent, has been proportionately greater than in the older sections. Whether this comparative rapidity of diminution will continue to characterize the production from Tilbury East and Romney, or whether the fluctuation is of a temporary character and will be compensated by the opening up of fresh pools from time to time, must remain for the future to show.

A statement of the production by districts, kindly furnished by Mr. W. J. Harvey, supervisor of the bounty paid by the Dominion Government on crude petroleum produced in Canada, and covering the last three years, shows the rapid increase and decrease of yield in the new fields, and also the decrease in the older ones:

| Field                        | Production<br>1906 | Production<br>1907 | Production<br>1908 |
|------------------------------|--------------------|--------------------|--------------------|
|                              | Bbl.               | Bbl.               | Bbl.               |
| Lambton . . . . .            | 377,286            | 304,212            | 265,368            |
| Tilbury and Romney . . . . . | 106,992            | 411,588            | 201,283            |
| Bothwell . . . . .           | 44,827             | 42,727             | 39,228             |
| Leamington . . . . .         | 39,652             | 6,133              | 9,334              |
| Dutton . . . . .             | 19,376             | 14,977             | 13,743             |
| Thamesville . . . . .        | 175                | 237                | .....              |
| Comber . . . . .             | 651                | ....               | .....              |
| Total . . . . .              | 588,962            | 779,876            | 528,959            |

The first strike of oil in the Tilbury field was made in December, 1905, the second producing well was drilled in March, 1906, and the third in the following month.

In Romney oil was struck about the close of 1906, and by the beginning of March, 1907, there were seven producing wells, several of which came in with a yield of over 1,000 barrels each per day. In July, 1907, the Tilbury and Romney wells were in full flow, making about 35,000 barrels of oil, while in November, 1908, seventeen months later, the production had fallen to about 12,000 barrels. As will be seen by the figures given above, the yield in the new field rose from 106,992 barrels in 1906 to 411,588 barrels in 1907, falling to less than half the latter quantity in 1908. Of the total decrease from 1907 to 1908, 250,917 barrels, Tilbury and Romney were responsible for 210,305 barrels and Lambton for 38,844. In other words, while the falling-off in Lambton in 1907 compared with 1906 was 19 per cent., and in 1908 compared with 1907, 12 per cent., the drop in Tilbury and Romney from 1907 to 1908 was 51 per cent.

**Petroleum Prices and Products.**—The price of crude petroleum in the oil fields of Ontario is regulated by the price paid by the Imperial Oil Company at its various receiving stations. It may cost the producer five to twenty cents a barrel to deliver it, so that the price is not a net one to him. There were practically no fluctuations during the year. The price delivered to the Imperial Company for nearly the first three months was \$1.34 per barrel, and for the remainder of the year \$1.44 per barrel; the average price therefore for the Petrolea district was \$1.41½ per barrel. At producers' tanks in the Tilbury field the price was \$1.17 per barrel from 1st January to 15th March, and from 15th March to 31st December \$1.27 per barrel. These prices of course do not include the Dominion Government bounty of 51½ cents per barrel. A barrel contains 35 Imperial gallons.

There are two petroleum refineries in the Province, owned and operated respectively by the Imperial Oil Company, Sarnia, and the Canadian Oil Refining Company, Petrolea. Together, these companies distilled 44,675,120 gallons of crude in 1908, so that the domestic product was equal to only 53 per cent. of the total quantity distilled. The remainder was of course imported from the United States.

### Natural Gas.

While the production of petroleum declined, the yield of the allied combustible, natural gas, underwent a decided expansion, and for the first time in the statistical history of the mineral industry of the Province, the value of the natural gas product was greater than that of petroleum, the figures for 1908 being petroleum \$703,773, natural gas \$988,616. The increase in 1908 over 1907 was \$242,117, or 32.4 per cent.

There are three fields in which natural gas is produced in quantity, (1) Welland County, (2) Haldimand County, to which must now be added Norfolk, (3) Essex and Kent. The Welland field produced gas to the value of \$343,560 or 34.8 per cent. of the whole, the Haldimand field \$535,182 or 54 per cent., and Essex and Kent \$109,874 or 11.2 per cent. In 1907 the proportions respectively were 46.44 and 10 per cent. Haldimand has now taken the lead, and the prospects are for a still further increase in the production of this district.

### Minor Products.

Among the lesser items on the list of mineral products of Ontario, apatite or phosphate of lime figures in 1908 for the first time in many years, some 881 tons having been raised of a value of \$7,048. The greater part of the output was shipped to Buckingham, Quebec, for



the manufacture of phosphorus for the English market, but part was manufactured into fertilizer at Smith's Falls, Ontario. Prices are higher in England than in Canada, and next season producers intend to export to that country. The competition of the cheaper and lower grade phosphates of the southern States has for a long time shut out the richer but more expensive product of Ontario and Quebec.

Corundum, owing to the stoppage of production on the part of the Canada Corundum Company, which has hitherto been the largest producer, shows a considerable falling-off as compared with recent years. This company's business in 1908 consisted mainly in marketing the stock of grain corundum on hand, little fresh rock being raised from the mines.

A plant for the grinding of talc has been erected in Madoc, Hastings County, by Messrs. Geo. H. Gillespie & Co., and began operations in September, 1908. It has a capacity of 400 tons per annum, the product being ground talc of three grades, namely, No. A1 (200 mesh), No. 1 (180-mesh), and No. 2, 3 per cent. retention on 180-mesh. Grade A1 is used by the makers of talcum powder and similar articles, No. 1 by soap makers, tanners and leather manufacturers, and No. 2 by the paper trade and in foundry facings. The product sells at the works at \$20 and \$25 per ton for No. A1, and \$15 to \$18 per ton for No. 1, including price of barrels, or \$7 per ton for No. 2, including sacks. The bulk of the product grades No. 2.

#### Revenue for the Year.

The total receipts on account of mining revenue for 1908 were \$549,178.94, apparently a heavy decrease as compared with those for 1907, when the amount was \$1,731,720.72. It must be borne in mind, however, that the income for 1907 was swelled by two items of an unusual character, paid in on account of the purchase of the beds of Cobalt and Kerr Lakes, and amounting together to \$1,155,000. Excluding this sum, the revenue for 1908 was only \$27,541.78 less than that for 1907. The items are as follows:—

|                                              |          |    |
|----------------------------------------------|----------|----|
| 1. Sales of mining land.....                 | \$23,445 | 30 |
| 2. Leases of mining land.....                | 20,611   | 81 |
| 3. Licenses, permits and recording fees..... | 137,730  | 20 |
| 4. Mining royalties.....                     | 218,071  | 96 |
| 5. Supplementary Revenue Act.....            | 125,078  | 06 |
| 6. Provincial Mine.....                      | 12,592   | 90 |
| 7. Diamond drills.....                       | 11,286   | 11 |
| 8. Assay Office, Belleville.....             | 362      | 60 |

Total.....\$549,178 94

#### Mining Royalties.

The details of item 4, mining royalties \$218,071.96, are as follows:—

|                                    |           |    |
|------------------------------------|-----------|----|
| O'Brien Mine.....                  | \$109,915 | 31 |
| Crown Reserve Mine.....            | 29,257    | 85 |
| Temiskaming & Hudson Bay Mine..... | 78,898    | 80 |

Total.....\$218,071 96

The O'Brien mine pays to the Crown twenty-five per cent. of the value of the shipments of ore, the consignments being valued at the pit's mouth. The agreement between the owners of the mine and the Crown exempts the latter from any part of the cost of underground work, or hoisting the ore, etc., but in calculating the royalty the surface expenses, such as sorting the ore, haulage and freight, etc., are to be deducted. The difficulty of proportioning exactly these expenses between the parties has led to a modification of the agreement,

by which practically the same rate or royalty is payable, while the deductions are more easily and certainly arrived at. A method of computing the royalty on concentrates is also provided. Up to the end of 1908 the O'Brien mine had contributed in all royalties amounting to \$332,860.37.

The arrangement with the Temiskaming & Hudson Bay Mining Company is somewhat different. It provides for the payment to the Crown of a net royalty of fifteen per cent. on the receipts from sales of ore. The amount paid in by this company last year included royalty on past shipments as well as those made in 1908.

In the case of the Crown Reserve mine, the royalty, which is at the rate of ten per cent. on the value of the ore at the pit's mouth, is really part of the purchase price of the property. The history of the sale of this parcel of land by the Crown is interesting. Part of the bed of Kerr Lake, in the Township of Coleman, which had not been staked out or claimed, as no vein was known to exist upon it, was offered for sale by tender in December, 1906. The highest bid was \$52,000, which was not considered sufficient. Tenders were again asked for, and the condition was added that a royalty of ten per cent. should be paid on the value of the ore. The highest offer received in response to the second advertisement was \$178,500, which was accepted. A rich vein was struck in developing the mine, and the Crown will probably receive at least as much by way of royalty as the original price.

There are several other properties charged with payment of royalty direct to the Department of Lands, Forests and Mines, exclusive of those which contribute royalties to the Temiskaming and Northern Ontario Railway Commission. They include the Hargrave locations, 25 per cent., Chambers-Ferland properties, 25 per cent., and Scully claims, 10 per cent. None of these paid anything in 1908, but the Chambers-Ferland Company will be a contributor in 1909.

The total receipts from mining royalties up to the end of 1908 were as follows:—

|                                    |           |    |
|------------------------------------|-----------|----|
| O'Brien Mine.....                  | \$332,860 | 37 |
| Crown Reserve Mine.....            | 29,257    | 85 |
| Temiskaming & Hudson Bay Mine..... | 78,898    | 80 |

Total.....\$441,017 02

#### CANADIAN PATENTS.

121580. E. H. Meyer and J. Stilleson, Niagara Falls Centre, Ont., preparation of nitrogen compounds.

121594. A. C. Campbell, Asheville, N.C., coal washers and ore concentrators.

121606. J. Gayley, New York City, tape moisteners.

121621. O. Kjellberg, Kvillekatan, Sweden, methods of electric welding, brazing and soldering.

121624. B. R. and M. J. Lyster, Whitefield, N.H., appliance for the distillation of wood alcohol and other products.

121656. J. Stilleson, Niagara Falls Centre, Ont., preparation of lime nitrogen.

121674. L. L. Knox, Ben Avon, Pa., furnaces, Keystone Furnace Construction Co.

121676. J. T. Greenway, Malvern, Australia, separation of metallic sulphides from sulphide ores, Potter's Sulphide Ore Treatment Co.

121691. H. Roberts, Pittsburg, Pa., appliance for coating metal.

Fetherstonhaugh & Co.



# PNEUMATIC VERSUS ELECTRIC DRILLS IN MINING SERVICE

By Frank C. Perkins.

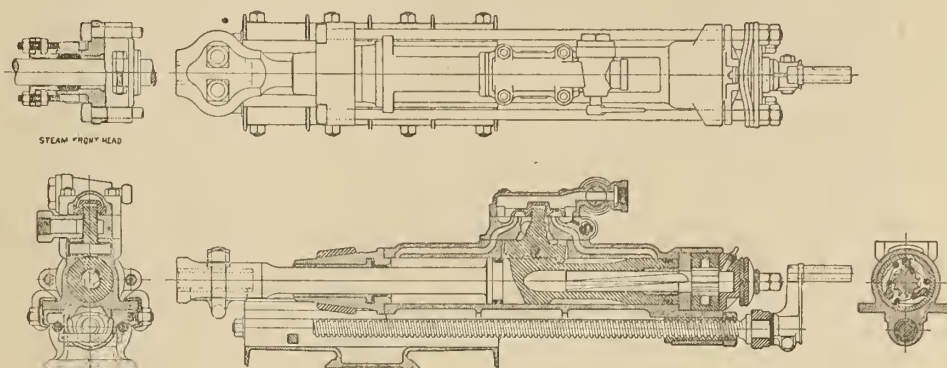


Fig. 1.

The wonderful development of electric power transmission and electrically driven labour-saving devices has caused compressed air apparatus of various types, such as pneumatic hoists and compressed air locomotives, to be replaced by electric motor-driven machines very largely. The pneumatic rock drill and pneumatic hammer and rivetter used in mining and structural work, however, have successfully met electric competi-

tion. The reason pneumatic rock drills, pneumatic hammers and rivetters have held their own, and are now more extensively employed than ever before, is without doubt on account of their many advantages, the compact construction and the development of more economical and efficient means of producing compressed air power.

In mining service and in the construction of tunnels and foundations for large buildings the pneumatic rock drill is reliable, economical and rapid in operation. The exhaust air from the mining pneumatic rock drill aids in the ventilation and it is claimed has little to fear from the competition of the electric drills.

The accompanying drawing, Fig. 1, shows the details of construction of a modern American pneumatic rock drill of the Chicago type in which the valve motion is of the "tappet" or "positive" motion design.

The tappet or rocker is forged from high-grade tool steel, accurately machined and hardened where it comes in contact with the piston and valve; it operates on a straight pin made from tool steel, working in renewable hardened steel bushings. To hold the pin in position endwise and also prevent leakage through bushings, steel plates are provided. These are let into the side

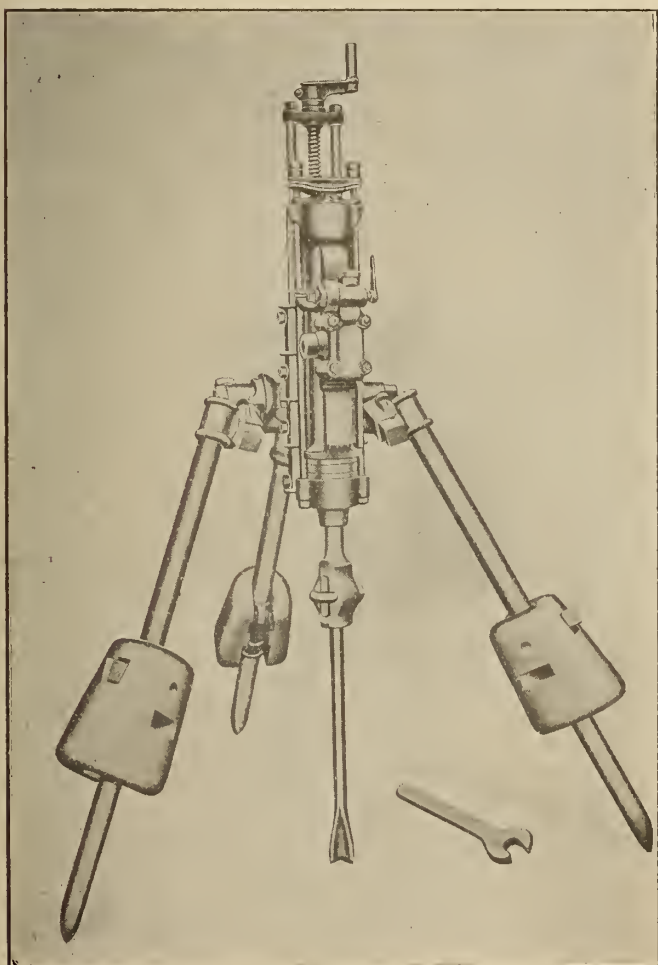


Fig. 2.



Fig. 3.



Fig. 4.

walls of the cylinder and locked in position by the under face of the valve seat.

It will be noted that the valve is of the lightest possible section consistent with strength. A chamber is provided in the valve seat to form an oil reservoir for the lubrication of the drill and a wicking leads the oil from the reservoir into a port of the valve seat. The pulsation of the operating fluid provided for continuous lubrication.

It will be noted that the cylinder is extended and is also provided with a boss or lug for the feed nut. It may be stated that piston rod and chuck are forged in one piece from high-carbon steel, and then put through an elaborate process of oil treatment and annealing which toughens and increases the tensile strength 25 to 30 per cent. Piston rings are made

up in two pieces, from special high-grade steel accurately machined, and are held to walls of cylinder by steel springs.

An important feature of this pneumatic drill is that the rotating mechanism is arranged to slip or release should the steel become bound in a hole while drilling in seamy or loose rock.

In mining and other service owing to the diversity of conditions under which and the various positions in which a rock drill has to operate, several holding devices have become recognized as standard, and these, owing to the nature of the service, must be simple, rigid, easily adjustable and of as light construction as possible, consistent with strength required.

The accompanying illustration, Fig. 2, shows the form of tripod used, while Fig. 3 shows the method of



Fig. 5.



operation. Wherever conditions will permit its use, the tripod is the mounting most largely used for rock drills, because of its ready adaptability to rough surfaces, its easy and very varied range of adjustment, its great strength and rigidity.

The accompanying illustrations, Figs. 4 and 5, show the use of the column, shaft bar or stoping bar, the former with single screw and the latter with double screw at the base. The illustration, Fig. 5, shows the double screw column and pneumatic drill in service at Ishpeming, Michigan, at the Cleveland Cliff Mines.

The column, either single or double screw, with its arm, clamp and safety clamp has a field of its own in tunneling, shaft sinking, stoping or drifting, and is of equal importance with the tripod as a rock drill mounting. The column can be made up to any desired length, but the usual lengths are six and eight feet, measured with the screws run clear in. It is made up of a heavy piece of tubing capped on its upper end, and provided with a foot piece suitable either for a single or double screw and the screws have a range of 6 to 12 inches, depending on the size of the column.

It may be stated that a drill may be mounted directly on a column or on the column arm, which gives a great range of adjustability. A safety clamp is provided and is fastened on the column under the swinging arm. This sustains the weight of the arm when loose and allows it to be safely swung into any desired position.

In mining work or in tunnel or shaft construction there is always employed wood blocking, not less than three inches thick, interposed between cap of column and wall, and between screws of foot block and wall. This provides for a secure and elastic fastening. All single screw columns are provided with a locking cap, which is constructed to securely clamp the jack screw, preventing it from loosening under the jar of operation.

The quarry bar or open-cut channeler is another style of rock drill mounting which was developed for quarry work, particularly in getting out "dimension stone," this problem calling for a portable apparatus which would drill a series of holes close together and "in line," and then be used to break down the walls between the holes, with a minimum of labour and time to make the necessary changes.

It is maintained that besides having a recognized place as a labour-saving device in quarry work, it also is largely used in open-cut contract work for "channeling" the sides of the cut, a class of work to which it is very well adapted.

### CORRESPONDENCE.

Editor Canadian Mining Journal:

Sir,—Before discussing Prof. A. P. Coleman's letter regarding the glacial origin of the Lower Huronian conglomerate at Cobalt, it might be well to concisely state both sides of the question. The facts for and against the proposition are briefly the following:—

For: (1) The presence in the conglomerate of pebbles whose scratches and markings are similar to those found in recent boulder clay. (2) The presence of large boulders (supposedly miles away from their source) in the fine-grained greywacke. (3) The widespread occurrence of the conglomerate. (4) Its similarity to the South African Dwyka. (5) Its general resemblance to Pleistocene boulder clay.

Against: (1) The conglomerates have not been

found resting on a glaciated basement. If Coleman attributes a glacial origin to the Lower Huronian conglomerates of the Lake Superior region, the absence of a glaciated basement there is significant, because this area has been studied in great detail by the United States geologists. (2) The scratched stones already discovered are known to occur in a very small area—a few acres, in fact. (3) Over widespread regions the fragments making up the lower part of the conglomerate have resulted from the breaking down of the adjacent rock. This much, at any rate, has not been transported by ice. (4) The scratched pebbles may have been produced by other causes. (For years the scratched pebbles in an English conglomerate were thought to represent glacial action. Recent studies have shown the scratches to have been produced by movement on talus slopes.) (5) The large boulders in the conglomerate may have been transported by agencies other than ice.

There is another point in regard to this question which needs consideration. If we recall the succession in the original Huronian area, it will be remembered that the Lower and Middle Huronian are both present. But each of these latter groups has lithologically similar conglomerates, except that the Upper group carries limestone fragments. Therefore the arguments for a glacial origin of one group apply equally well to the other. The logical question readily follows: Would Prof. Coleman have two distinct pre-Cambrian glacial periods? So far as I know, he has never discussed this aspect of the problem, and yet it would appear that such a question must be faced, especially since the stratigraphical position of the Cobalt conglomerate is tentative. It would consequently be interesting to have a definite list of those localities whose conglomerates are considered by Prof. Coleman to be glacial in origin.

In regard to the large granite or other boulders in the conglomerate "miles away from any known source," it is well to remember that in spite of their source being unknown, they may nevertheless have come very short distances indeed. In other words, we cannot tell what rocks underlie these boulder conglomerates, except where the contacts are actually seen.

Prof. Coleman's comparison of the boulder clay at Toronto is not an apt one, for the reason that the underlying rocks are comparatively soft shales and limestones. It is not to be expected that such materials would be so likely to show a glaciated basement. But the hard granites, limestones and cherts which everywhere underlie the Huronian conglomerate present an entirely different proposition.

If it is true that "the real test of glacial action is to be found in boulder clay and the glaciated stones in it," it is also true that Cobalt is the only place where these scratched stones have been found. But in spite of this fact, Prof. Coleman gives a glacial origin to "the thousands of square miles of boulder conglomerate in northern Canada reaching from Chibougamou to Lake Winnipeg."

It cannot be said that the suggestion of Van Hise regarding the finding of a glaciated basement ignores the fact "that near the edge of a glaciated area where the thickness of the ice is not great, the ice sheet often moves for miles over loose materials without ever reaching the rock surface beneath." It need not, surely, be pointed out to Prof. Coleman that these conditions are not widespread, and that an ice sheet that could leave such enormous masses of boulder clay as he believes



have been left, would certainly produce in many areas a perfect glaciated surface.

From the miner's point of view it matters little if the Cobalt conglomerate be of glacial origin. Moreover, there is nothing particularly original about the idea of a glacial period in pre-Cambrian times. Such an origin was considered many years ago for the Torridonian sandstones and conglomerates in Scotland. And five years ago we see from the following sentence (first edition Cobalt report, page 48) that Miller also had this theory in mind. "In the present state of our knowledge we have little warrant for claiming that the granite boulders, often two or three feet or more in diameter and distant a couple of miles from exposure of the rock, indicate glacial conditions during Lower Huronian times, although we have no proof to the contrary." But since then it is frankly admitted that the finding of pebbles, the scratches on which many glacial men think have been caused by ice, is of much interest. Nevertheless, the reasons why too great stress should not be placed on this point have already been pointed out.

Incidentally, it may be remarked that two of the most eminent glacial geologists—Chamberlain and Salisbury—have seen the Cobalt conglomerates. I am not aware that they are in accord with Prof. Coleman's sweeping conclusions.

Finally, the gist of the matter, with many of those whose opinions Prof. Coleman flippantly classes as "off-hand," will remain as it was—we look for a glaciated basement, and until that is discovered I repeat the statement that the subject will remain an open question.

Yours, etc.,

CYRIL W. KNIGHT.

Toronto, Nov. 23, 1909.

## PERSONAL AND GENERAL.

Mr. Clifford Smith, mining engineer, was in Toronto recently.

Mr. Boyd Magee has resigned the management of the Keeley mine and has opened offices in Toronto and Haileybury, as consulting mining engineer. Mr. Magee has had valuable experience in the development of mining properties, especially in the Cobalt region.

Mr. E. Jacobs, Secretary of the Western Branch of the Canadian Mining Institute, is in Nelson, B.C. Mr. Jacobs will probably remain in the Boundary region until January next.

Mr. C. H. Macnutt has assumed the general management of the Poderosa Mining Co, Ltd, in Chile.

Mr. J. M. Turnbull recently examined various mining prospects on the Queen Charlotte Islands, Swanson Bay, and the Portland Canal district on behalf of the Consolidated Mining and Smelting Company.

Mr. J. J. Harpell will return from England to Toronto for a short stay early in January.

Mr. Martin Nordegg leaves shortly for Germany. He will be absent for three months.

Mr. Howells Frechette, of the Mines Branch, Ottawa, passed through Toronto on his way to Ottawa last week.

Mr. R. B. Lamb, consulting mining engineer, passed through Toronto, on November 24. Mr. Lamb is associated with the C. L. Constant Company, 42 Broadway, New York.

Mr. J. E. McEvoy is in Victoria.

Mr. A. B. Willmott has returned from a professional visit to British Columbia.

Mr. E. A. Collins, B.Sc., president and general manager of the Vermilion River Copper Company, Massey, Ont., was married on November 24th to Miss Maud Walsh, of Kingston, Ont. Mr. and Mrs. Collins have our best wishes.

## SPECIAL CORRESPONDENCE.

### NOVA SCOTIA.

**Glace Bay.**—The Glace Bay Gazette, in its issue of the 17th November, had a thoughtful editorial on the present aspect of international and national trades unionism in Canada, called forth by the contemptuous references to Canadian nationalism which have characterized the speeches of the delegates to the American Federation of Labour Convention recently held in Toronto. The Gazette justly comments on the apparent loss of national self-respect which has been displayed by the applause given to reflections on our national aspirations made during the speeches of delegates from the United States. A Mr. Jerome Jones, of Atlanta, Georgia, referred to the national movement in Canadian trades unionism as "a national plague, which must soon be eradicated," and another delegate, a Canadian this time, mentioned several Canadian unions, notably the P. W. A. of Nova Scotia, as unions "which did not know enough to keep quiet" before the great ones from the United States who are trying to run our national affairs. The comment of the Gazette editorial on these treasonable utterances is so pertinent that we quote it in full:—

"The way we are building up a nation in Canada is attracting the attention of the world. We have established a system of government, a trade policy and an industrial system, without reference to American ideals. We are working out stupendous

problems in transportation without any American assistance. In fact, in all phases of national life we have learned to stand on our feet. If the trade unionists of Canada, or any considerable section of them, intend to step out from this national march of progress and submit to American domination, it will be the worse for trade unionism in Canada, for the time is not far distant when Canada will be populous enough and powerful enough so that her people will not submit to foreign dictation in their industrial life.

"At all events, if a large proportion of the organized workmen of Canada have definitely decided to abandon national aspirations and allow themselves to be swallowed by the unionism of the United States, even though it masquerades as international, they should, we think, have at least enough self-respect to insist upon the Americans using inoffensive language while in the swallowing act."

The foregoing, we feel sure, expresses the opinion of that portion of the Canadian population in which are bound up the fairest hopes of this Dominion, although it may not meet with the complete approval of those little Canadians whose mental calibre is too small to appreciate the destiny of their own country.

**Glace Bay, Nov. 20.**—The U. M. W. A. Strike.—Continuing the figures for the strike period into the month of November,



the Dominion Coal Company's production shows the following progression:—

|                            | Output. | Average daily Output. |
|----------------------------|---------|-----------------------|
| July . . . . .             | 136,000 | 4,200                 |
| August . . . . .           | 154,000 | 5,900                 |
| September . . . . .        | 180,000 | 7,200                 |
| October . . . . .          | 205,000 | 8,200                 |
| November 1 to 15 . . . . . | 108,000 | 8,700                 |

The highest daily output since the strike was obtained on the 11th November, when 9,770 tons was raised. The average daily output for the second week of the month was over 9,000 tons. The Hub Colliery (No. 7), which has been idle since the strike commenced, resumed operations about the 21st of the month, and with this mine producing it is probable the output will reach the 10,000 ton mark during the closing week of the month. This steady progression tells its own tale. No. 6 is now the only colliery that is not working.

### ONTARIO.

Cobalt, Nov. 20.—The new gold discoveries up in Porcupine Lake have been creating a great deal of excitement, and many prospectors have gone in to try and locate ground in this new territory. Some of the veins found are very extensive, and in several places free gold in considerable quantities is showing. A government engineer was sent up to look over the district and report on the discoveries that had been made, and another engineer will shortly be sent up to make a more complete examination than was possible in the first instance. The report states that the gold is found in milky quartz veins, the country rock being of schistose structure. Among the claims reported on are those of R. Bruce, in Tisdale Township, where the discoveries consist of a series of quartz veins varying in width up to 18 inches. They have been stripped for a short distance, and on the contact of one of the veins with the country rock free gold can be seen. It is stated that these claims have been sold to Messrs. Drummond & Dobie for ten thousand dollars. The largest vein so far found in the district was seen on the Wilson property. This vein has been traced for over 400 feet, and at one point it appeared to be over 100 feet in width. So far no work has been done in this section to prove up the veins, but it is understood that the parties who purchased the Bruce claims are sending in a force of men to develop their holdings. Another sale has also been negotiated whereby Herbert Fade sold four claims in Tisdale Township to an eastern company for twenty thousand dollars.

A short time ago the dynamite thaw house at the King Edward mine blew up, and although the concussion was severe and was felt for miles around, no serious damage was done. The electric current, however, was cut off at some of the mines for some time.

The White Reserve mine in the Maple Mountain district has started work again under new management. The mines were shut down a few months ago, largely on account of internal troubles among the directorate, and not on account of the physical condition of the mine. A short time before operations were suspended, a shipment of eight tons of ore was made, which assayed 4,280 ounces to the ton. The mine is fully equipped, and operations will be carried on steadily.

The concentrator at the Buffalo mine is now running by electric power brought from the plant being installed at Hound Chutes. The equipment supplying this power is, however, only a small temporary unit, and the main plant will not be in a position to deliver power for some time to come. The cyanide plant in operation at that property has been very successful, and the first shipment of bullion from the camp has been made from their mill. It amounts to thirty thousand ounces, representing a recovery of 80 per cent. from 8-ounce tailings. The company estimates that this plant will mean a saving of about five thou-

sand ounces per month. The consumption of cyanide is much less than was estimated.

Nipissing has completed surface prospecting for this season, and during that time one hundred men have been employed, and have run about 33 miles of trenches. This is the greatest amount of surface work that has yet been done for one year on this property. The results obtained have been very satisfactory, and altogether about 24 new veins have been discovered. Some of these are among the most important that have yet been found. One of the main veins is numbered No. 122, and a new shaft-house and ore-house are being erected on Nipissing hill, from which it will be worked. This vein was cut on the 80-foot level, and already about 300 feet of underground work has been done on it. On the surface it has been traced for over 800 feet, and carries high grade ore. These 24 new veins do not include the discoveries that have been made by underground development.

The first shipment from the district of North Cobalt since the Green-Meehan ceased shipping about two years ago has been made by the North Cobalt Mining Company. The shipment consists of about ten tons of high grade ore, which has been taken from the vein discovered some time ago. This property is controlled by the Jacobs Exploration Co.

One of the most important sales in the Gowganda district for this season was concluded a short time ago, when the Crawford property, which adjoins the Reeves-Dobie, was sold for one hundred thousand dollars.

Crown Reserve has declared its regular dividend of 6 per cent., with a 9 per cent. bonus, and an additional 10 per cent., making a total of 25 per cent. for the last quarter of 1909. This company only commenced to pay dividends in 1908, when they paid 4 per cent. in July of that year. When this last quarter's dividend has been paid for 1909 the Crown Reserve will have paid a total for the year of 70 per cent. on their issued capital, and since they started paying dividends a total of 90 per cent. For 1909 this represents a disimbursement of \$1,291,109.

The T. & H. B. has declared another dividend of 300 per cent.

The Muggley Concentrator is now being run by electric power supplied by the Cobalt Power Co. The mill has recently been enlarged, and will now have a capacity of 135 tons of ore per day. A contract was made some time ago with the La Rose for treating their dump, and this will be run through at the rate of about one hundred tons a day. At the present time the concentrator is treating ore from the La Rose, Silver Queen, Right of Way and City of Cobalt.

A new discovery has been made on the Little Nipissing property on Peterson Lake.

The annual report of the City of Cobalt Mining Co. has been issued, and states that during the year a total of 739 tons of ore, representing 456,091 ounces of silver, were shipped. The City of Cobalt is now in a much better position than it was a few months ago, due largely to the development in the Huronian slates, in which have been found large bodies of high grade ore. It is interesting to note that the T. & N. O. Commission has been paid \$69,772 in royalties, and that \$17,000 is still due them.

The Harmon Mining Co. has completed negotiations for the Peverley lease, which adjoins the Ophir property, and a force of men will be started to work in a short time to prospect the property. This same company is negotiating for several claims in the new gold fields, and if these are secured, active work will be started at once.

The accumulation of ore underground at the McKinley-Darragh has necessitated the cutting off of several of the drills, as there is enough ore in the mine to supply the mill, which is treating about 80 tons a day. The capacity of the mill is being increased to about 120 tons a day, and it will soon be completed. The mill, however, cannot be started on its increased capacity until the power is ready for delivery. Development work at the Savage is restricted on account of the same lack of power. This property has shown up very well during the past year, and



preparations are being made to carry on the work on a larger scale than formerly. The new shaft at the Savage has been connected up with the old No. 3 shaft at the 75-foot level. On the main vein a drift has been run for about 260 feet, high grade ore showing in the drift practically all the way. Another vein containing some silver has been found on the surface, and as soon as mining operations can be started a cross-cut will be run from No. 2 vein to cut it.

The Temiskaming mine is now doing practically all its work on the lower level, and exceedingly good results are being obtained. The work on the 300-foot level on the main vein has shown up some of the richest ore that has yet been found on the property. In places the vein is 12 inches wide, carrying high values in silver. No. 2 vein on the same level has been developed for over 100 feet with corresponding values. The wall rock is also well mineralized, which will give a large quantity of milling ore. The main shaft is now down 340 feet, and a winze is being sunk from the 300-foot level midway between No. 1 and No. 2 shaft. Shipments from this property will be restricted until the new concentrator is in operation. The Beaver property in the same section is getting good values, and it is understood that a shipment of high grade ore will be made in a few days. The Shamrock property has opened up several veins on the 200-foot level, some of which show good values in silver. This property is one of several operated by the Jacobs Exploration Co.

One of the largest deals in the South Lorrain district was consummated a short time ago, when a syndicate concluded the purchase of the Newman claim, which is situated a short distance from the Wetlauffer mine. One of the best discoveries in that section was made on this property recently, where a vein carrying good quantities of silver was traced on the surface for over 300 feet.

The Trinity Cobalt Mining Co., situated on the northeast side of Cross Lake, has been sold for twelve thousand dollars. Most of the property lies under water. A small plant was installed and a shaft sunk for about 70 feet. This property was started as a wildcat, and the shaft was sunk for its entire distance through clay. The company formerly operating this property got into financial difficulties, and work was stopped some time ago.

At the annual meeting of the Trethewey Company the directors declared a dividend of 15 per cent., making a total of 25 per cent. for the year.

Since Cobalt Lake has been working under its new management very encouraging results have been obtained. A few days ago a new vein was opened up. Where encountered it showed about 30 inches of mineralized area, and carried considerable quantities of high grade ore. It is important to note that the new discovery was made on the 190-foot level in the slate underlying the conglomerate.

It has been announced that the Argyle mine, which was closed down on account of litigation, will resume operations in December, and the shaft will be continued to the 300-foot level as rapidly as possible, and from that point cross-cuts will be run to pick up the veins that are known to exist. The court proceedings have been settled, and the property has been sold for \$37,000. It is understood that \$25,000 will be spent on development work, and that an entirely new plant will be installed. When work was closed down several good showings had been found.

The St. Lawrence Cobalt has ordered a small plant for its claim on Greenstone Island, on Sasaginaga Lake, and will recommence work. This company is capitalized at \$1,500,000, and has its headquarters in Buffalo.

The Temagami Reserve Mining Co. has acquired control of the Floyd and the Gavin Hamilton. The former is in West Coleman, and the latter situated in the Elk Lake district. Considerable work has been done on the Gavin Hamilton, and the shaft has been sunk for over 100 feet.

It is understood that a change has been effected in the control of the Cobalt Central, and that new interests now control the property. The old management has come in for considerable criticism on account of the fact that they have never issued a complete financial statement of the company's affairs. It is stated that the concentrator was built by money advanced by Nivens & Son who have been interested in the property for several years, and it is said that this indebtedness has been as high as \$160,000.

Although the new gold finds in the Porcupine Lake have diverted attention from the gold district in Beatty and Munro Townships, there is a good deal of work being done in this section. The fissures in which the gold occurs are running from 8 to 10 feet wide, and in these are many stringers of quartz which carry the values. The Painkiller Lake Co. now has a shaft down on the vein over 50 feet. On the surface this vein was only 18 inches wide, but at the bottom of the shaft it is now over 7 feet wide. All through are scattered stringers carrying high values in gold. Considerable work is also being done by the Treadwell Co., and good showings have been reported. The work done on the six Hyland claims has been productive of favourable results, and a larger force of men will be sent in to open up the properties. There will be a good winter road into this section, and during the winter one or two plants will probably be installed.

The main excitement in Cobalt during the past couple of weeks has been the sale of the Gillies Limit lots. This section has come in for a great deal of attention on account of the good finds made on the Young-O'Brien, Waldman, and York-O'Brien. These companies are rapidly developing their holdings, and the results obtained are largely responsible for the much greater interest displayed in the last sale. During the time since the announcement of the sale was made the Limit has been crowded with prospectors. There were several properties on which there were fairly good showings, which were expected to bring large returns, but the result of the sale has far exceeded expectations. Of the fifty-five lots offered for sale, 761 acres were sold for an aggregate of \$362,786, and the price per lot averaged \$9,810. As was expected, the bids were not very high in the western portion offered for sale, and from A64 to A81 lots were not disposed of. These prices are very greatly in advance of any bid at the former sale. The highest price paid was for A53, which brought \$35,100. The list of successful tenderers is as follows:—

A46, Grant, \$10,300; A47, B. Sawyer, \$7,355; A48, Fraser & Ogilvie, \$26,230; A49, S. D. Madden, \$7,600; A50, Ross, \$6,500; A51, B. Sawyer, \$16,667; A52, B. Glidden, \$7,300; A53, Fraser & Ogilvie, \$35,100; A54, R. Glidden, \$25,100; A55, A. Pierce, \$12,500; A56, McLaughlin, \$22,000; A57, A. J. Young, \$3,284; A58, Burrows, \$8,885; A59, A. Pierce, \$12,600; A60, A. Pierce, \$12,300; A62, Winch, \$3,250; A63, Deville, \$2,100; A64, Deville, \$2,900; A81, Beaumont, \$12,000; A82, Beaumont, \$7,220; A83, Ross, \$3,500; A84, A. J. Young, \$2,015; A85, Roberts, \$2,119; A86, A. Pierce, \$7,000; A87, A. Pierce, \$12,600; A88, Roberts, \$2,470; A89, Curry, \$2,750; A90, Bell, \$9,779; A91, A. Oakley, \$26,556; A92, Beaumont, \$12,110; A93, Beaumont, \$7,220; A95, Boyd, \$2,992; A96, Barnet, \$5,960; A97, Waldman, \$4,728; A98, Fraser & Ogilvie, \$2,000; A99, Waldman, \$2,000; A100, Russell, \$4,100.

**Kenora.**—One of the latest reports in this district to cause excitement is the rumour that the original operators of the Mikado mine on the Lake of the Woods were misled as to, or misjudged, the strike and dip of the lode and sank their incline shaft right through the auriferous belt into the black trap. The strike of the main lode is northwest and southeast from the shafthouse, the dip being towards the east. The incline shaft was sunk almost due north, and from the report received it would seem that it passes through the wall of the main lode about the 240-foot level into the black trap. Drifting was then begun, but was pushed west instead of east; so that the main lode was



not again located, and men were withdrawn from this drift and stoping was carried on from these levels, which were in the main lode; that is to say, above the 240-foot level, where the shaft passed the wall of the lode.

Major Vereker and Capt. Machin, M.P.P., have just returned from making a careful investigation of the property, and they both express themselves as being in favour of this view of the situation. The difference between the strike of the lode and the direction of the shaft taken into consideration with the dip of the lode to the east, would make this report seem reasonable, and would, moreover, account for the former report of the vein pinching out, for as the incline shaft approached the wall of the lode, which, by the way, is very indistinct and difficult to locate, it would naturally cut off a wedge-shaped area of the lode and give an appearance in the shaft of a gradual pinching out of the vein matter.

The prospector coming into the Lake of the Woods district with intent to pursue his calling can equip himself in Kenora for his trip for a reasonable expenditure. His outfit, consisting of the following items can be purchased in town for the listed prices:—

|                                     |        |
|-------------------------------------|--------|
| 6 x 8 Tent .....                    | \$5.00 |
| 2 Pair blankets .....               | 7.00   |
| 1 16-foot canoe (second-hand) ..... | 35.00  |
| Pack sack .....                     | 3.50   |
| Compass .....                       | 1.00   |
| Prospector's pick .....             | 1.00   |
| Fry pan .....                       | .35    |
| 2 Pots .....                        | .60    |
| Fishing Tackle .....                | .90    |
| Axe .....                           | 1.00   |
| 22 Rifle .....                      | 8.00   |

If, in addition, the prospector decides to carry dynamite, he may purchase it from either of two companies in town, the Hamilton Powder Co. or the Ontario Powder Co. His steel will cost him 10½ cents per lb., striking hammer 12 cents per lb.; Bellows, 28-inch, \$9.00; bellows, 24-inch, \$5.50; anvil, \$5; shovel, \$1.25. It is almost unnecessary, however, for the prospector to carry dynamite, because no matter where he may be in this district, it is almost always merely a short canoe trip to some point where powder can be obtained.

The openness and adaptability of this country for prospecting can only be fully realized by those who in other districts have had to pack their stuff mile after mile through rough country, where the undergrowth tears the packs off their backs rather than let them through. Here in this district the Lake of the Woods and the adjacent bodies of water have such a number of arms extending into land that the prospector can always make camp on the lake shore and avoid the heavy packing so universal in other districts.

Moreover, if not satisfied with the Lake of the Woods as an arena for his activities, he can paddle into Shoal Lake, from there into Indian Bay, up the Falcon River into Falcon Lake, portage from Falcon Lake into either High Lake, Little High Lake or by means of two small lakes into West Hawk. From West Hawk Lake he can portage into Star Lake or Cross Lake to the westward, or Long Pine Lake to the east. From Long Pine a half mile portage takes him to Macara Lake, heading north, and from the eastern end of Long Pine he can portage to Harvey Lake. A creek connects Harvey Lake with Whitefish; a portage, and two small lakes and a creek connect Whitefish to Malachi Lake. To the east of Malachi we come to Duck Lake; after traversing this lake we portage into Pelican Pouch, where there is the division point of the two routes returning to Kenora, one striking the Winnipeg River, after traversing Lakes Catherine and Culloden, which has two terribly long portages; the other reaches Keewatin two miles from Kenora, after traversing Pickerel, Greenwater, Rosina, Bell, Lulu and Middle Lakes. At Keewatin a 200-yard portage places the pros-

pector once more on the Lake of the Woods, where he can paddle into Kenora after a round trip of 150 miles, where his longest portage has been two miles, but the greater number of his portages have been under a quarter of a mile. With regard to the prospecting already done in this district, I may say that hardly any prospecting at all has been done on this Falcon River route, with the exception of Star Lake, whose western shores have been fairly well gone over; in fact, this district has received but scant attention from the prospector, in spite of the remarkably good showing of those few claims which have been located in this West Hawk area.

#### BRITISH COLUMBIA.

**Rossland.**—Ore shipments from this camp during the past couple of weeks have been averaging about 5,500 tons per week. The shipments from the Le Roi 2, Ltd., are running in the neighbourhood of 450 tons of \$23 ore per week, and particular interest attaches at this time to the shipments from the Le Roi mine, which are said to be of a grade of ore that will average \$60 and over per ton in gold. The Le Roi for the week ending October 30th shipped 735 tons of this class of ore. At present the product of the Le Roi mine is being treated at the Consolidated smelter at Trail, B.C., the tonnage not being great enough to warrant the resumption of work at the company's own smelter at Northport. It is generally understood, however, that if the new finds of ore in the portions of the Le Roi mine now undergoing development prove on further investigation to be extensive and sufficiently rich, then the company will start up the Northport smelter. By the time this came about there is no doubt that the Velvet-Portland lessees would be in a position to send a steady tonnage to the Northport smelter, to say nothing of several Washington copper mines that would be glad to contribute custom ores. One of the diamond drills has been taken from the depths of the Le Roi, as a number of minor strikes have been made that the management feel should be drifted on before anything else is done. More machine drills have been added to the working force, and the other two diamond drills are running steadily.

With the advent of cold weather the hopes of the lessees of the smaller mines around this district have fallen somewhat, and work has been discontinued in the South Belt. The Blue Bird Mining Co. has not followed out its intention of doing development work to depth on the rich ledge recently opened up on its property. It is to be hoped that this enterprise will not be dropped, for upon development work in the lower levels depends the future of the South Belt, where several rich surface veins have been worked in a small way for years. The opinion has been expressed by several eminent engineers that good mines will be found some day in this debatable district.

**The Boundary.**—The ore shipments from this district lately have been record-breakers in the history of the Boundary copper section, and indicate the marked progress that has been made in the copper mining situation here during the past eighteen months, despite the many disadvantages that the local companies have had to contend with, such as the low price of copper, strikes in the coal fields, car shortages, etc. For the week ending October 23, the Granby Phoenix mines shipped 27,573 tons, the heaviest shipments in the history of the mines, and exceeding the February high-record mark of this year by over 2,000 tons. During the week ending October 30th the Mother Lode mine of the B. C. Copper Co. shipped 11,572 tons, making a new high record. The Oro Denoro mine of the same company has been shipping as high as 1,200 tons per week, and shipments from the Snowshoe property, controlled by the Consolidated, have crept up to the 5,050 mark. Seven of the enlarged furnaces are working at the Grand Forks smelter, treating nearly 26,500 tons of Granby ore per week. At this rate of treatment, if it is maintained, it looks as though the prophesy of the Granby management, that they would make copper this year at



a figure lower than 10c per lb., would be fulfilled at the end of the current fiscal year.

It will be remembered that when the Dominion Copper property was first offered for sale that the Granby, B. C. Copper and Consolidated Companies considered acquiring it, and rumour had it that a figure of over \$300,000 had been offered for the property, but was refused. At the sheriff's sale in Vancouver the property was sold for \$261,500. There were no bidders outside of the New York men who had a representative present. Why no other bids? Probably we can guess. There may have been a master mind behind the whole affair. By a little aerial mining legerdemain the old shareholders were shaken off. The new concern was organized, and now the B. C. Copper practically acquires control of that property by securing 132,000 of the 250,000 shares of stock, paying for it with about 80,000 shares of its own stock and the balance cash. That's surely cheaper than \$300,000! Again, a prominent New York copper capitalist secures a seat on the directorate of the B. C. Copper Co. He practically controls New Dominion Copper. Then two of the B. C. Copper officers secure seats on the Board of the Dominion Co. It is announced, also, that one of the big copper syndicates in New York is interested in both B. C. Copper and New Dominion Copper. When prices were low these men bought heavily of B. C. Copper. It is still being picked off the local market, and there is little or no New Dominion Copper offered. It looks as though the New York syndicate saw a chance to get a couple

of good low-grade copper properties at a bargain by a little skillful work—and got them. We take off our hat to the master mind behind, and watch the chessmen to see what next move the hand from the cloud will make.

At the present time the three furnaces of the B. C. Copper Co. are working full force smelting nearly 2,000 tons of Mother Lode and Oro Denoro ore per day. The smelting facilities at the Greenwood smelter will be enlarged, however, before long. This will be necessitated by an arrangement to treat ore from the New Dominion mines and by shipments from mines of the B. C. Copper Co. that will be opened up by the new spur or branch of the Canadian Pacific from Hartford Junction to Wellington camp, where this company owns the Jackpot group, and has a good tonnage of ore awaiting shipment. The president of the B. C. Copper Co. states that with the increased amount of ore treated, and with the added smelter facilities the company can make copper for less than nine cents per pound. While this may be necessary, in order to make any kind of a profit on Dominion ore we would point out that the Granby Co., which has every facility, and is at present treating close to 4,000 tons per day, were only able to cut their cost to 10c for the year ending June 30th, 1909, and which was only .0024 lower than for the previous year. The Granby ought to reduce their 10c cost this year, however, and no doubt will do so unless some labour or fuel trouble interferes. This cost figure covers mining, smelting, converting and marketing, with gold and silver deducted.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

Halifax.—The conspiracy case, arising out of charges brought by the U. M. W. A. against Nova Scotia coal operators, particularly the Dominion Coal Co., has been postponed to November 30th.

Sydney.—In order to meet the demands for raw material which the enlargement of their plant now in progress will entail, the Dominion Steel Co. has decided to place an order in England for two 10,000-ton steamers for delivery about a year hence. The new steamers will be specially designed for carrying ore from Wabana mines to the plant at Sydney.

### ONTARIO.

Ottawa.—The appropriation for the fiscal year 1910-11 for the Geological Survey are as follows: For explorations and surveys, \$140,000; for publication of reports, maps, etc., \$75,000; for purchase of books, instruments, laboratory apparatus, etc., \$40,000; to pay for specimens for Victoria Museum, \$10,000; for temporary, technical, and clerical assistance, \$2,000. The total is \$267,000, an increase of \$27,000 over 1909-10. The Mines Branch appropriation is \$79,500, which is \$2,000 less than the appropriation for the current year.

### ALBERTA.

Frank, Alta., Nov. 10.—With the ratification in Frank of the reorganization of the Canadian-American Coal & Coke Company, what is probably the most important deal in relation to coal mining in Western Canada will have been consummated, as it will bring into the coal industry of this country the most eminent coal mining man of France as well as a number of other French financiers of almost equal prominence and importance.

The head of the new concern will be M. Maurice Tilloy, of Paris, President of the d'Ostercourt mines of France, Director in the Mines de Lens of France, and member of what is known

as the Collieries Committee of France, which formulates the laws providing regulations for coal mines in that country.

Associated with M. Tilloy as officers and directors of the new company will be: First Vice President, O. L. Liegeart, President of the old Canadian-American company; Second Vice-President, Baron de Bellicize, Director of the Schwitz Bank of Paris; Treasurer, General G. C. Avon; additional Directors, Felix Colomer, Consulting Engineer of the old company; Jacques Bernard, Director of the Sultanats of Haut-Oubanghi, a French syndicate trading in Africa, also Director of the Franco-Norlandais of Culture and Trade, a bank of Paris; Leon Clere, Director of one of the largest oceanic transportation companies of France, with headquarters at Havre, and S. W. Gebo, one of the founders of the Canadian-American company, who will be managing director.

With the final consummation of the reorganization the old Canadian-American Company passes out of existence even as to name, as the new company is known as the Canadian Consolidated Coal Company. The capital is reduced by \$500,000, the old company having being capitalized at \$2,500,000, while the capital stock of the reorganized company is approximately \$2,000,000. The company is being incorporated in England, with head offices in London, and is capitalized at 400,000 pounds, with 80,000 shares at par value of 5 pounds each.

In the allotment of stock under the reorganization the shareholders of the Canadian-American Company receive one share of the new stock for 10 shares of the old, leaving 30,000 shares of treasury stock, or \$75,000 subscribed and paid in, to be devoted to the improvement and further development of the company's property here. Of this \$750,000 cash now in the treasury, \$180,000 is to be devoted to new work, \$140,000 to liquidation of the outstanding liabilities of the old company and \$220,000 to reimbursements of the bonds of the old company leaving a working capital of 7,210,000.

The reorganization has already taken place and only awaits



formal ratification by the shareholders of the Canadian-American Company. This will occur at the stockholders' meeting to be held in Frank Monday, when virtually the whole of the stock of the old company will be voted in approval of the new deal.

Alfred Muller, general manager of the Canadian-American Company, and who was appointed liquidator of the concern, will be the general manager of the reorganized company.

One item in the new work planned is the building of a battery of 200 coke ovens. They will be of the new Belgian type of oven, except as to four which will be the Solvay-Copie by-product ovens, from which will be obtained tar for the manufacture of briquettes, and the gas from which will be used under the boilers of the power plant.

Another will be the erection of a new steel tippie at the present shaft with a handling capacity of 2000 tons in eight hours, and over which the entire output from the various openings will be handled. The tippie will have a modern screen rig and only the various grades of screened coal will go to the market, while the slack will go direct to the coke ovens, which will have a capacity of 500 tons of coke a day.

Another item will be the installation of an electric plant to supply power for operating the old mine, the new tippie and the company's sawmill, while another will be the building of a \$60,000 sanatorium building at the sulphur springs owned by the company at the western limits of the village.

The foundation for a 100 foot extension to the power house are now in progress for the accommodation of additional boilers, the electric plant and compressed air plant. The foundations are practically completed and will be ready for the installation of two boilers of 250 horsepower each, which are expected to arrive by December 1. The air compressor and a 500 kilowatt generator are expected to follow within a few weeks and will be installed the first of the year. The other improvements determined upon will be proceeded with at the opening of the spring.

In connection with the plans for further development of the coal measures, as soon as the compressed air plant is ready for service, the sinking of a slope on the old working seam will be started, and from this two large seams, one to the East and one to the west of the present working seam, will be opened. Later in the year, according to the plans, the sinking of a new shaft will be started and a new system of haulage installed, probably that of gasoline engines.

It is the expectation of General Manager Muller that by the expiration of 1910 the company will be in the market with an output of anywhere from 1500 to 2000 tons of coal and 500 tons of coke a day.

#### BRITISH COLUMBIA.

**Greenwood, B.C.**—Work on the coal property west of Midway, owned by the Boundary Mining Company, has been going on interruptedly since September 1 with very gratifying results. Some surface work has been done prior to that date and a number of showings were located. A shaft was then sunk to a depth of sixteen feet, cutting through the coal seam, which was about five feet in thickness at that point, to a sandstone bedrock. From this point the seam was followed for sixty-five feet. This shaft was intended for prospecting only, and proved the continuance of the seam to depth between clean and well defined walls.

At the present time work is being done on a tunnel from the flat below the bluff where the shaft was sunk. The tunnel will crosscut the coal seam at a depth approximating 150 feet and will open an enormous area from which coal may be taken by drifting. The mouth of the tunnel is about thirty-five feet above the level of the Canadian Pacific tracks, so that the handling and shipping of the product may be done over a gravity tramway.

The company has secured options on over 1,000 acres of land in the vicinity where the surface indications and the formations point to the presence of coal. It has also staked three square miles to the west of its present holdings, on which it will secure a lease from the government. Arrangements are now being made to secure a drilling outfit to prospect this extensive area. The location of the present workings is on land owned by the company, comprising 500 acres and including some very valuable ground along the Kettle River.

In addition to the coal activity in this locality, it is learned that the Ingraham Creek timber limits are to start immediately upon the erection of a mill, which they expect to have in operation before summer. They have taken an option on ten acres of land owned by the Boundary Mining and Exploration Company, which they propose to use as a site.

**Vancouver**—Reports from the Portland Canal Mine state that the ore cut by No. 3 tunnel shows up well in native silver.

## MINING NEWS OF THE WORLD.

### ONTARIO.

**Cobalt.**—The following extracts from a letter issued by President Carson, of the Crown Reserve, are of interest:—

Mr. Cohen, our manager, has not sold out his holdings in Crown Reserve to myself nor to anyone else, but has still a very substantial holding of stock in our company.

Work has not been stopped on the main or Carson vein, but is progressing as usual.

Our shipments have not fallen off. We have during the whole of this year shipped two cars of high-grade ore per month, and from seven to ten cars of low-grade ore per month. Our shipments so far this month consist of one car of high-grade ore, one shipment of bullion, and four cars of low-grade ore.

The main vein over the 100-foot level is not half stoped out, nor is the one at the 200-foot level of very inferior grade. Our values keep very rich at the 200-foot level, and we are quite satisfied with the prospects of our property.

The statement that we have not been able to find any bonanza deposits emanating from the Kerr Lake property may or may not be true, but one fact is true, namely, that we have

cut vein No. 15 assaying 4,031 ounces, vein No. 16 assaying 4,396 ounces, vein No. 17 assaying 4,336 ounces, vein No. 18 assaying 8,528 ounces, vein No. 21 assaying 2,225 ounces, and vein No. 24 assaying 6,480 ounces, the whole in our cross-cut to the north of the Kerr Lake line.

We have \$7,000,000 worth of ore blocked out on our main vein down to the 200-foot level. We also know that we have ore in vein No. 14 assaying 12,895 ounces, and in the six veins named in paragraph five a very large asset in addition to our main vein.

We have never been bothered in any shape or form with water in our mine; in no place are our workings in the slightest danger, and our main ore body can be extracted absolutely to its roof, for the very simple and satisfying fact that nearly the whole of it is in absolutely dry land.

Finally I would say that the directors of the Crown Reserve Company have never used their property or holdings for stock jobbing purposes. Our mine has been run honestly in the interests of our shareholders. We are one of the few mines in Cobalt who issue a quarterly statement of our workings to our



shareholders, and these statements are also accompanied by maps showing our surface and underground workings. We have in charge of our property an able and capable engineer, who has the full confidence of such an eminent and disinterested expert as the gentleman who has not sufficient confidence in himself to write his article over his own name, but who hides himself under the name of the celebrated mining town of Cobalt.

#### UNITED STATES.

##### California.

A suit is pending in the oil districts of Kern County. The point to be decided is whether the filing of a mineral claim on oil land does or does not give the locator any preference right to possession in advance of the actual discovery of oil. If the decision is in the negative, the ground will be open for all to explore, priority of discovery being the only advantage.

##### Utah.

The Denver & Rio Grande Railway has acquired much new equipment, including eight new Mallet compound locomotives, to handle the increased output of ore from Bingham.

##### Montana.

Butte Coalition has declared its first dividend since December, 1907. At that date a dividend of 15 cents per share was paid. The present dividend is at the rate of 25 cents per share.

#### GREAT BRITAIN.

It is reported that the Buenos Ayres and Rosario Railways have placed orders for 200,000 tons of large coal with the Standard and Lewis Merthyr Coal Companies for delivery over the whole of next year at 15s 10½d per ton f.o.b., or about 2s per ton above the figures paid last year. It is also stated that one of the largest Admiralty coal collieries has just concluded negotiations for the supply of half a million tons of large coals at a price slightly under 16s 9d f.o.b. The figures obtained in all cases are considered decidedly good.

The workmen's side of the Welsh Coal Conciliation Board on November 1st formally notified the owners' side of a demand for an advance of 2½ per cent. in the wages of the miners in the Associated Collieries as from 1st December next. Wages now stand at 47½ per cent. above the standard rates of December, 1879. The statutory meeting of the Conciliation Board to consider this application will be held on Wednesday, 10th November.

The Middlesbrough Customs return of iron and steel shipments from the Tees ports during October shows the best month's trade this year owing to the demand from America for Cleveland pig-iron. The total shipments of pig-iron were 115,900 tons, exclusive of about 12,000 tons from the Cleveland port of Skinningrove, and 19,780 tons went to the United States and 9,019 tons to Canada. The inquiries in the market on American account give promise of increasing trade across the Atlantic. The other best over-sea customers for pig-iron were: Germany, 12,009 tons; Italy, 10,851 tons; Sweden, 7,973 tons, and Japan, 5,297 tons.

The exports of manufactured iron and steel, mainly railway material, galvanized sheets and joists, were: Manufactured iron, 9,589 tons, and steel, 43,464 tons. Argentina took 7,183 tons, Canada 3,459 tons, Cape Colony 7,938 tons, Natal 2,733 tons, Portuguese East Africa 1,562 tons, South Nigeria 1,731 tons, Egypt 419 tons, India, 7,100 tons, Japan, 1,764 tons, New South Wales 1,017 tons, South Australia 2,760 tons, Victoria 773 tons.

#### MEXICO.

An option on the Santa Gertrudis silver mine, Pachuca, has been obtained by the Camp Bird Company. The Santa Gertrudis has two reduction plants. At one the Boss system of amalgamation is installed; at the other the Patio process. The

ore carries 5 grammes gold and about 60 ounces silver. About \$8,000,000 worth of ore is in sight.

#### SOUTH AFRICA.

Johannesburg.—The annual meeting of the Johannesburg Consolidated Investment Company was held on November 2nd Mr. Charles Marx being in the chair. The net profit on the year's operations after allowing for depreciation and writings off is £478,000. The amount carried forward after deduction of the 10 per cent. dividend already declared and paid is £162,000 including £79,000 brought forward from the last account. The balance-sheet reflects assets of £5,464,000 and liabilities to the public £707,000, the surplus of assets being \$4,757,000, of which £1,639,000 is regarded as liquid. The aggregate market value of the shareholdings is estimated at the date of the meeting to be £1,500,000 in excess of the book value. The Municipal Council valuation of the real estate exceeds the book value by £500,000. The aggregate value of the gold won during the financial year by the producing mines of the group was £2,274,000, and of the dividends distributed £680,000. The average working costs show a further reduction, which would have been greater but for the shortage in native labour, an improvement in which is expected. Good results are anticipated from the company's large interests in the Consolidated Langlaagte Mines, Ltd., the Randfontein Deep, Ltd., and the Van Ryn Deep Ltd., the finances of which mines have now been placed on a satisfactory footing. The position of the Johannesburg Consolidated Investment Company, Ltd., is regarded as exceptionally strong, and the statement as the best ever presented to the shareholders. The maintenance of regular dividends is anticipated.

Sympathetic reference was made by the chairman to the impending unification of South Africa, which was confidently expected to further general prosperity.

The report and accounts were unanimously adopted, and a special general meeting approved and adopted the amended articles of association as submitted.

Johannesburg.—Mr. C. Waldie Pearson, chairman of the Western Rand Estates, presiding at the annual meeting, severely criticised the authorities for refusing to make retrospective the clauses under the new Gold Law relative to the allocation of discoverers' rights as a reward for exploration by boring operations. Investigation of the position, however, goes to show that the company has been generously treated and has secured 2,540 mynpacht claims.

It is understood that two tenders have been received by the Government for leasing the two claim areas on the farm Modderfontein recently offered by the Government. One is stated to be on behalf of a syndicate of London capitalists in which the Consolidated Mines Selection Company is reported to be interested. The Government's decision on the offers is expected in about a fortnight.

The recent developments in the Village Deep on the main reef leader at the 18th level show a value of 23 dwts. over 42 inches.

Several quarterly reports are now available. The City Deep shows a development of 291,284 tons, averaging 8 dwts. The Bantjes Consolidated's payable development gives 86,005 tons averaging 9½ dwts. The subsidiaries of the Consolidated Gold Fields, Ltd., show a depletion of 340,000 tons in their reserve owing to scarcity of native labour available for development purposes.

#### NEW ZEALAND.

Wellington.—The output of gold in New Zealand during the month of October amounted to 49,906 ozs. valued at £198,366, as compared with 31,026 ozs. valued at £124,015, for the corresponding month of last year.



The output of silver during October was 153,167 ozs., valued at £15,281, as compared with 131,343 ozs., valued at £13,204, during October, 1908.

### AUSTRALIA.

Sydney.—A general strike of waterside union workers is threatened in sympathy with the strike of the Federated Coal and Shale Workers of Australia. Many of the collieries have been closed. It is doubtful if the men can finance the strike.

Sydney.—The gold yield of New South Wales during October amounted to 25,212 ozs., valued at £94,210, as compared with 24,788 ozs., valued at £93,272, during October, 1908. The yield for the ten months was 201,870 ozs., valued at £735,285.

Perth.—Following is the wording of cable announcing to the Great Boulder Perseverance Gold Mining Company the destruction of its plant:—

“At 1.30 fire started in main engine room. Following items destroyed: Air compressor building, engine room, Griffin Mills building and ore bins. Partially destroyed: Boiler house, dynamo house, buildings containing furnaces. Believe that fire is under control. Telegraphing to you later.”

The secretary states that the mine is fully insured.

Perth, W.A., Nov. 10.—Fire is raging in the surface workings of the Great Boulder Perseverance mine. The damage is estimated at £300,000. The adjacent mines have suspended operations and are concentrating their water supply on the fire.

Later.—It is now believed that the damage done by the fire at the Great Boulder Perseverance mine will not amount to more than £50,000.

Sydney, Nov. 10.—The men at four southern collieries have struck. Coal is selling at 50s a ton and the price of firewood has advanced 50 per cent. The proprietors declare that they will not confer with the men's representatives under threat.

Thousands of men have been rendered idle in other industries. The northern strikers have decided to picket the mines and thus to prevent repairs or baling. Great damage will be done as the result.

The P. & O. Steamship Company is prepared to import large supplies of coal from Japan.

The men at three additional southern mines have struck, and work is now going on at only three southern mines.

The Broken Hill miners have voted £1,000 to the strike fund and recommend a levy of 3s 6d per member weekly.

Sydney, Nov. 10.—Replying to a question in the Legislative Assembly to-day, Mr. Wade, the Prime Minister, said that the Government regretted the miners' strike, which would involve countless people in Australia, unless threatened developments were modified. The Government was greatly impressed with the gravity of the situation and alive to its obligations. The question was, could a method be devised by which the parties concerned could in the public and their own interests adjust the grievances, existing or alleged, by giving time for the employment of peaceful methods? He did not suppose that the Industrial Disputes Act was lifeless. In view of a possible immediate conference, it would be unwise to set the criminal law in motion, but if a determination to force war upon the community were manifested, the Government would without hesitation do its legal duty. The Prime Minister proceeded to appeal to the northern and southern colliers to retrace their steps, and to the western miners not to jeopardize the prospects of the expected award by the Wages Board upon their claims. He urged the waterside labourers not to break existing agreements, and reminded all that the power of outraged public opinion was greater even than that of Parliament. When the public came to realize that they had been victimized and made to suffer for unsubstantial grievances which could be redressed peacefully they would rise in their power and majesty and insist that public interests stood above all others. The strike, he continued, might paralyze the whole of the transport service of the Commonwealth, including the carriage of the wool and wheat harvests, and prevent food supplies—even milk for the children—from reaching the people. In conclusion, Mr. Wade appealed to the public to exercise patience and have confidence in the Government, which would perform its duty, being determined to favour no section, but to vindicate the people's rights.

Mr. McGowan declared that the Labour Party was in full accord with the Government's decision to allow the parties to confer together.

Melbourne, Nov. 10.—Owing to the coal strike, the interstate shipping companies have substantially increased their freight charges and fares, and are considering the question of laying up many of their passenger steamers at an early date.

## STATISTICS AND RETURNS

The Nova Scotia Steel Company's output of coal during 1909 will be about 800,000 tons, while ore will total about 450,000 tons. President Harris states that the company has made contracts for the sale of ore in 1910 to the extent of about 300,000 tons. He states that the submarine areas are being steadily worked, and that the "faults" encountered have not been serious.

### COBALT ORE SHIPMENTS.

The following are the shipments from the Cobalt camp for the week ending November 19th, and those from January 1st, 1909, to date:—

|                        | Nov. 19<br>Ore in lbs. | Since Jan. 1.<br>Ore in lbs. |
|------------------------|------------------------|------------------------------|
| Buffalo .....          | 52,193                 | 998,891                      |
| Carnegie .....         | .....                  | 63,410                       |
| Chambers-Ferland ..... | .....                  | 961,010                      |
| City of Cobalt .....   | .....                  | 100,122                      |
| Cobalt Lake .....      | .....                  | 141,340                      |
| Cobalt Central .....   | .....                  | 731,327                      |

|                     |         |            |
|---------------------|---------|------------|
| Coniagas .....      | 34,905  | 1,441,420  |
| Crown Reserve ..... | 185,605 | 5,418,209  |
| Drummond .....      | 70,000  | 1,452,100  |
| Foster .....        | .....   | 187,800    |
| Hudson Bay .....    | .....   | 1,166,485  |
| Kerr Lake .....     | 120,160 | 2,186,651  |
| King Edward .....   | 49,282  | 233,022    |
| La Rose .....       | 185,641 | 12,168,270 |
| McKinley-Dar. ....  | 106,926 | 1,936,632  |
| Nipissing .....     | 132,595 | 11,406,421 |
| North Cobalt .....  | .....   | 40,000     |
| Nova Scotia .....   | .....   | 480,810    |
| Nancy Helen .....   | .....   | 124,700    |
| Peterson Lake ..... | .....   | 324,040    |
| O'Brien .....       | .....   | 2,599,160  |
| Right of Way .....  | 61,503  | 2,726,090  |
| Silver Queen .....  | .....   | 684,844    |
| Silver Cliff .....  | .....   | 241,820    |
| Stewart, H. J. .... | .....   | 62,392     |
| Timiskaming .....   | 60,000  | 1,746,060  |
| Tretheway .....     | .....   | 1,818,323  |

Ore shipments to Nov. 19 from Jan. 1, are 52,441,349 pounds, or 26,220 tons. Total shipments for week ending Nov. 19 are 1,109,530 pounds, or 554 tons.

### SOUTHEASTERN B.C.

Ore shipments and Smelter Receipts for Week ending Nov. 6th.

Nelson.—Appended are the ore shipments and smelter receipts in detail of Southeastern British Columbia for the week ending November 6th:

#### ORE SHIPMENTS.

| Boundary—                      | Week.         | Year.            |
|--------------------------------|---------------|------------------|
| Granby .....                   | 25,775        | 857,947          |
| Snowshoe .....                 | 5,700         | 128,955          |
| Motherlode .....               | 11,264        | 255,910          |
| Oro Denoro .....               | 750           | 5,963            |
| Other mines .....              |               | 664              |
| <b>Total .....</b>             | <b>43,489</b> | <b>1,249,439</b> |
| <b>Rossland—</b>               |               |                  |
| Centre Star .....              | 3,313         | 150,850          |
| Le Roi No. 2 .....             | 532           | 26,381           |
| Le Roi No. 2 (milled) .....    | 260           | 11,280           |
| Le Roi .....                   | 445           | 10,382           |
| Other mines .....              |               | 260              |
| <b>Total .....</b>             | <b>4,560</b>  | <b>199,153</b>   |
| <b>Slocan-Kootenay—</b>        |               |                  |
| Queen (milled) .....           | 420           | 18,270           |
| Granite Poorman (milled) ..... | 250           | 10,850           |
| Whitewater Deep .....          | 700           | 30,600           |
| Kootenay Belle .....           | 70            | 3,050            |
| Second Relief .....            | 145           | 6,310            |
| Nuggett .....                  | 110           | 4,790            |
| Bluebell .....                 | 900           | 39,200           |
| Silver King .....              | 163           | 2,814            |
| St. Eugene .....               | 167           | 18,062           |
| Queen .....                    | 30            | 554              |
| Granite-Poorman .....          | 28            | 283              |
| Yankee Girl .....              | 35            | 2,308            |
| Van Roi .....                  | 20            | 799              |
| North Star .....               | 172           | 2,334            |
| Whitewater .....               | 59            | 1,323            |
| Enterprise .....               | 20            | 28               |
| Cork .....                     | 22            | 427              |
| Ruth .....                     | 120           | 978              |
| Other mines .....              |               | 18,501           |
| <b>Total .....</b>             | <b>3,431</b>  | <b>161,481</b>   |

The total shipments for the week were 51,480 tons, and for the year up to date 1,610,073 tons.

#### B.C. ORE SHIPMENTS.

Following is the tonnage of ore shipped from the mines of Rossland for the week ending November 13th, and for the year to date:—

| Mine.               | Week.        | Year.          |
|---------------------|--------------|----------------|
| Centre Star .....   | 3,500        | 150,705        |
| Le Roi Two .....    | 525          | 21,090         |
| Le Roi .....        | 35           | 8,345          |
| Hattie Brown .....  |              | 14             |
| Blue Bird .....     |              | 40             |
| O.K. ....           |              | 13             |
| I.X.L. ....         |              | 14             |
| <b>Totals .....</b> | <b>4,060</b> | <b>180,221</b> |

#### SMELTER RECEIPTS.

|                                   |               |                  |
|-----------------------------------|---------------|------------------|
| Granby, Grand Forks .....         | 25,765        | 858,397          |
| Consolidated, Trail .....         | 10,846        | 353,505          |
| B. C. Copper Co., Greenwood ..... | 12,014        | 261,873          |
| Le Roi, Northport .....           |               | 12,761           |
| <b>Total .....</b>                | <b>48,625</b> | <b>1,486,536</b> |

#### TORONTO MARKETS.

##### Metals.

Nov. 25—(Quotations from Canada Metal Co., Toronto.)

Spelter, 6 1-2 cents per lb.  
Lead, 3.75 cents per lb.  
Antimony, 8 1-2 to 9 1-2 cents per lb.  
Tin, 32 1-2 cents per lb. (very active).  
Copper, casting, 14 cents per lb.  
Electrolytic, 14 cents per lb.  
Ingot Brass, 9 to 12 cents per lb.  
Lake Copper, 14.50 (copper market very active).

Nov. 25—Pig Iron—(Quotations from Drummond, McCall Co.)

Summerlee, No. 1, \$24.00 (f.o.b. Toronto).  
Summerlee, No. 2, \$23.50 (f.o.b. Toronto).  
Midland, No. 1, \$21.00 (f.o.b. furnace).  
Coal Anthracite, \$5.50 to \$6.75.  
Bituminous, \$3.50 to \$4.50 for 1 1-4 inch lump.

##### Coke.

Nov. 23—Connellsville coke (f.o.b. ovens).

Furnace coke, prompt, \$2.90 per ton.  
Foundry coke, prompt, \$3.00 to \$3.25 per ton.

Nov. 23—Tin (Straits), 31.35 cents.

Copper, prime Lake, 13.75 cents.  
Lead, 4.40 cents.  
Electrolytic copper, 13.50 to 13.62 1-2 cents.  
Copper wire, 15.00 cents.  
Spelter, 6.42 1-2 cents.  
Sheet zinc, 8.50 cents.  
Antimony, Cookson's 8.37 1-2 cents.  
Aluminium, 23 to 24.00 cents.  
Nickel 40.00 to 49.00 cents.  
Platinum, \$29.50 to \$33.25 per oz.  
Bismuth, \$1.75 per lb.  
Quicksilver, \$51.00 to \$52.00 per 75-lb. flask.

#### SILVER PRICES.

|      |    | New York. | London. |
|------|----|-----------|---------|
|      |    | cents.    | pence.  |
| Nov. | 9  | 50¾       | 23¾     |
|      | 10 | 50½       | 23 5-16 |
|      | 11 | 50¾       | 23¾     |
|      | 12 | 50¾       | 23¾     |
|      | 13 | 50¾       | 23¾     |
|      | 15 | 50½       | 23¼     |
|      | 16 | 50½       | 23 5-16 |
|      | 17 | 50¾       | 23¾     |
|      | 18 | 50½       | 23 5-16 |
|      | 19 | 50¾       | 23¾     |
|      | 20 | 50¾       | 23¾     |
|      | 22 | 50¾       | 23¾     |
|      | 23 | 50¾       | 23¾     |
|      | 24 | 50¾       | 23¾     |

During the month of October the Tyee smelter ran 10 days, treating 2,850 tons of ore, producing a total of 279 tons of matte.

During October the Josie mine, Le Roi No. 2, shipped 2,380 tons of ore. Receipts from smelter were \$37,068 for 2,140 tons of ore, and \$2,103 for 75 tons of concentrates.



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When Volume I was issued, the tube mill, which has almost revolutionized gold and silver milling practice, was

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Volume IV describes in detail some 94 complete mills, showing the most approved modern and successful methods of applying ore-dressing principles in use to-day throughout the mining districts of the world. Comparisons are made with earlier descriptions to show modifications and improvements, and to point out errors in older plants.

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Complete Bibliographies are added. The Index for the entire four volumes has been remade and will be bound separately. It will be furnished without charge to purchasers of Volumes III and IV.

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# The Crow's Nest Pass Coal Co.

LIMITED

OFFICES

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**Fernie, British Columbia**

Gold Medal—Coal and Coke—Lewis & Clark Exposition, 1905.  
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Mines and Coke Ovens at Fernie, Coal Creek, Michel and Carbonado.

Annual Capacity of Mines, 2,000,000 tons. Coke Ovens, 500,000 tons.

We are shipping domestic coal to points in Manitoba, Alberta, Saskatchewan, British Columbia, Montana, Washington and Idaho, a territory of over 400,000 square miles, and WE ARE GIVING SATISFACTION.

We are shipping steam coal from Winnipeg to the Pacific Coast, and not only is it used in that vast area by the Railways and the largest firms, but also by the Great Northern Steamship Company's liners plying between Seattle and the Orient.

Our Michel Blacksmith coal is used in Railway forging shops in Winnipeg, seven hundred miles East, and in Vancouver, four hundred miles West.

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# The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch. If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertisers kindly mention this Journal.

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Holes at Floor Level or Roof Level or in any intermediate position in Coal or Dirt Band, &c.

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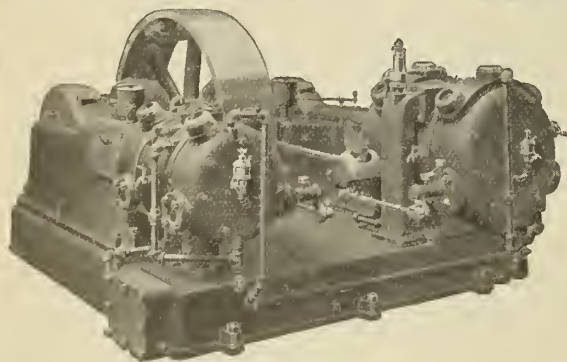
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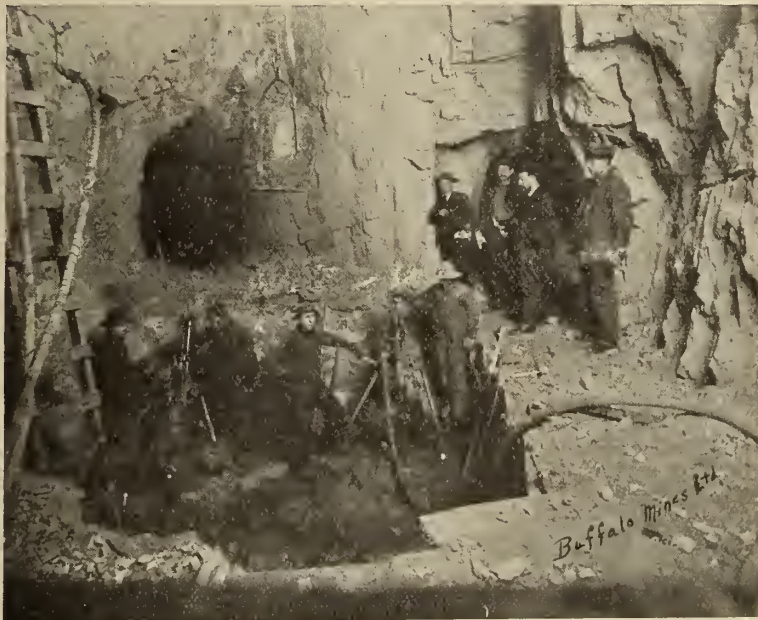
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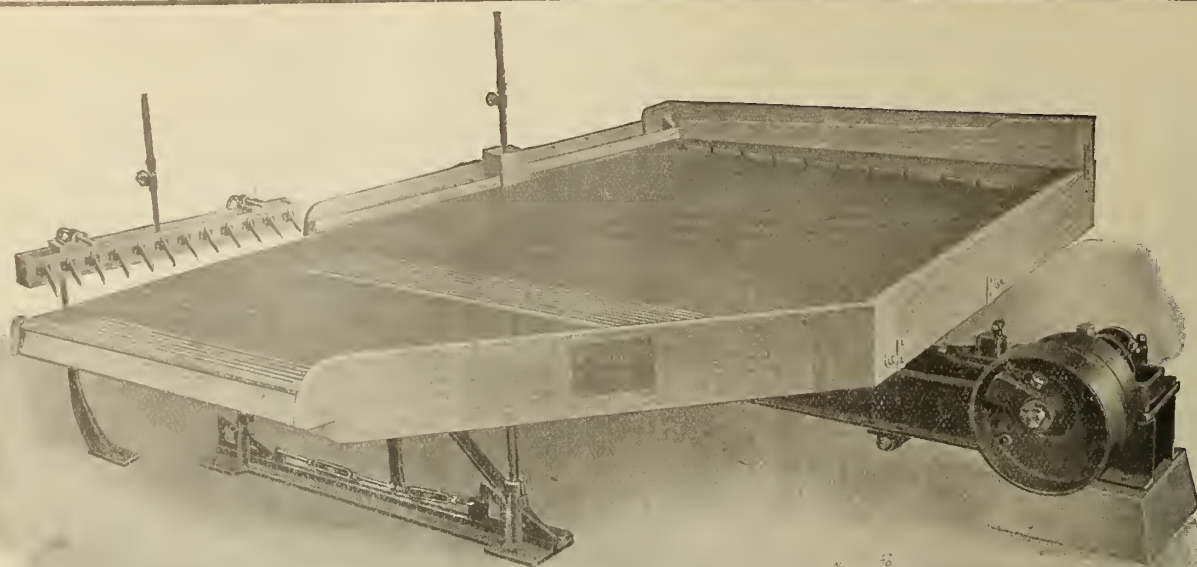
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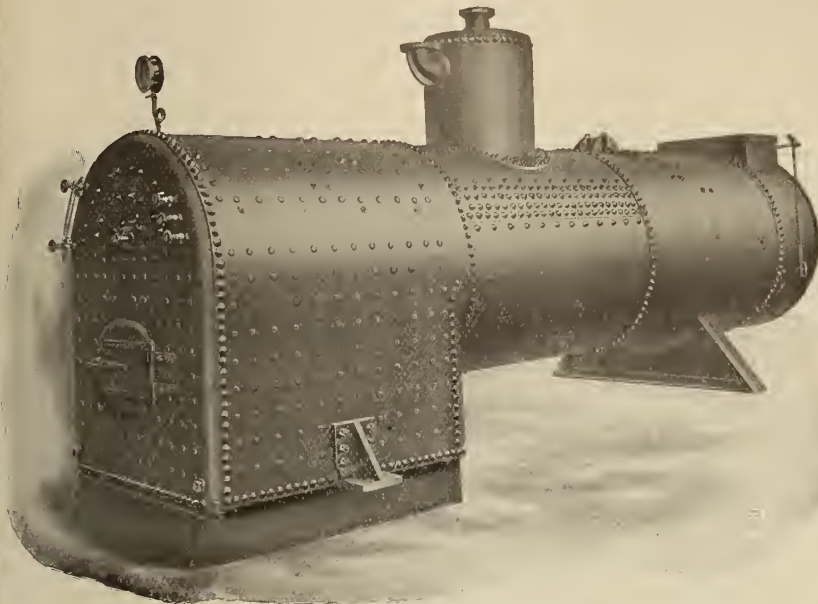
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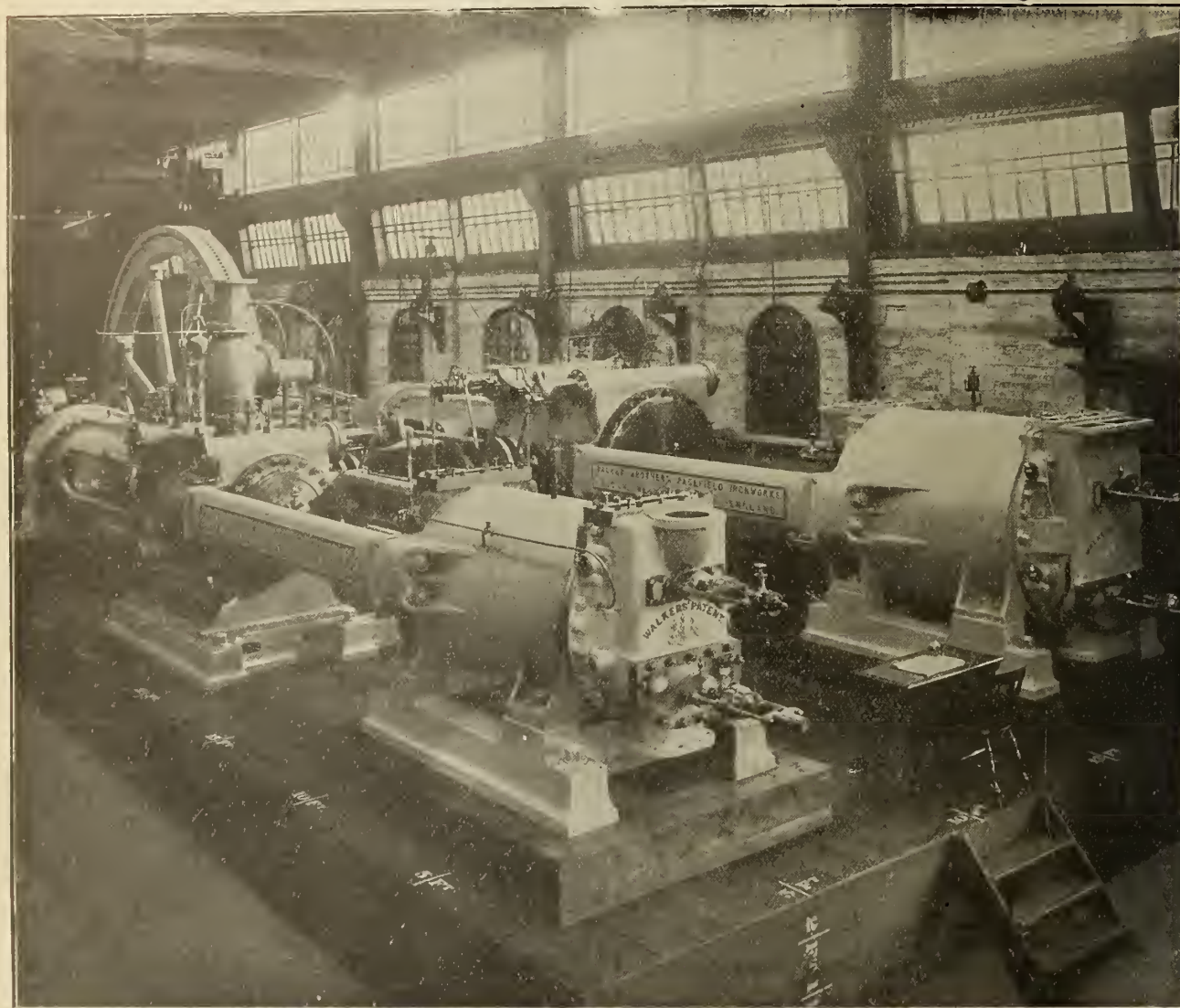


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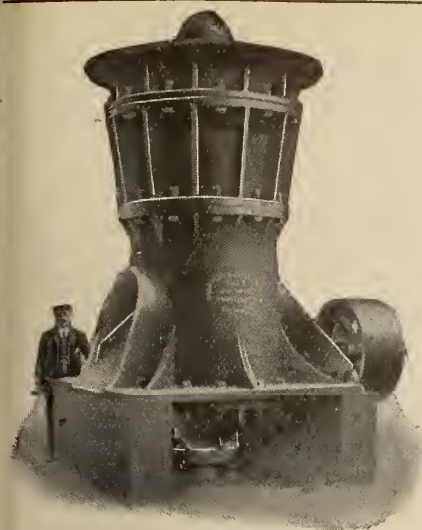
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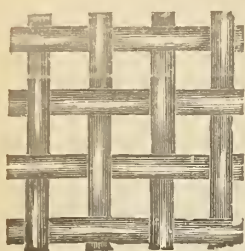
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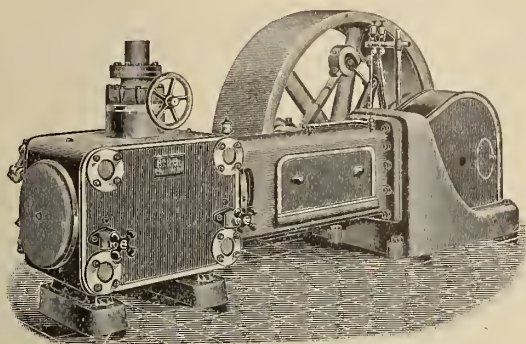
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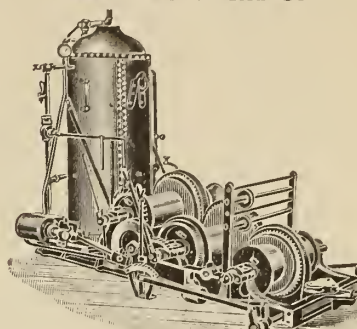
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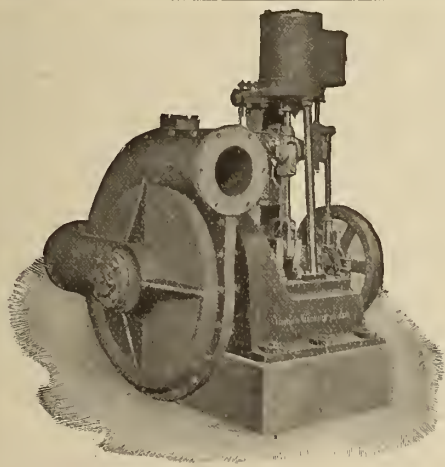
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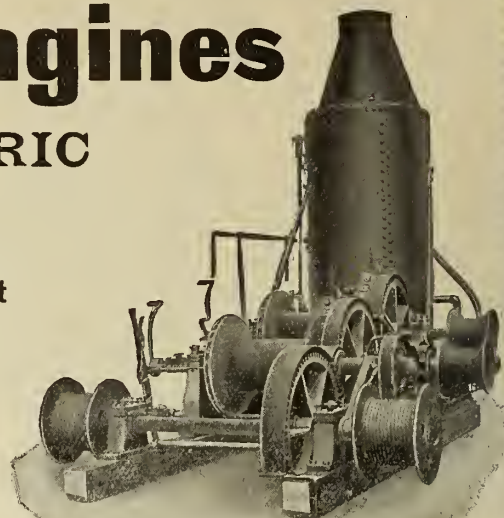
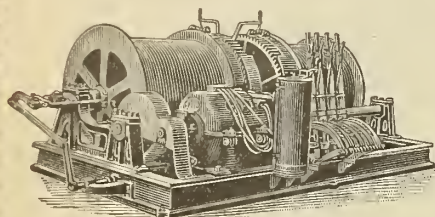
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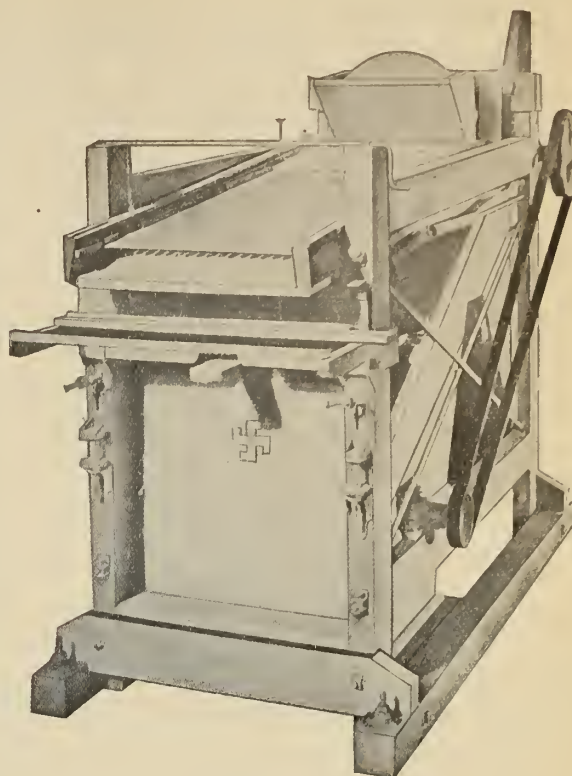
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
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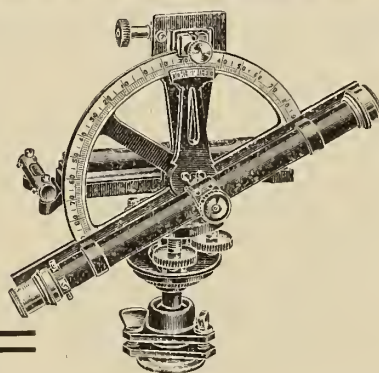
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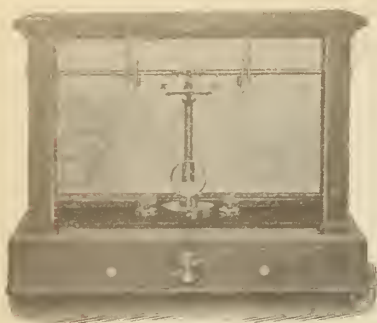
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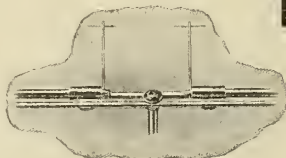
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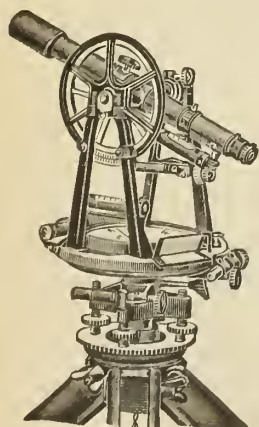


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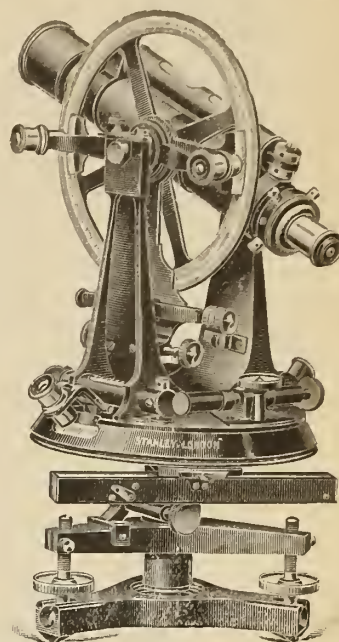
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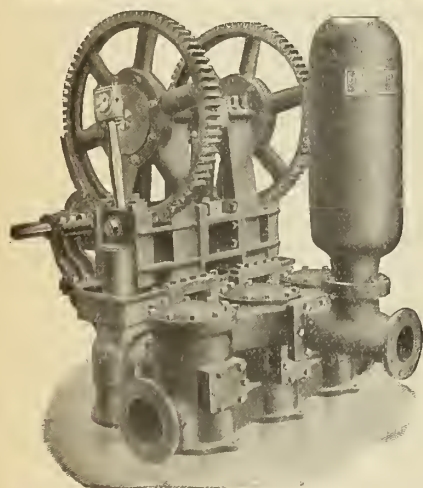
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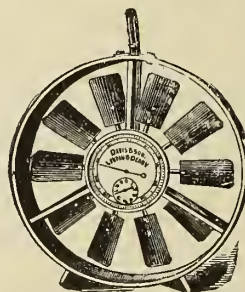
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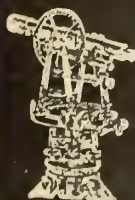
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# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, December 15, 1909

No. 24

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

**MINES PUBLISHING CO., LIMITED**

Head Office . . . Confederation Life Building, Toronto.  
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Editor:  
J. C. MURRAY, B.A., B.Sc.

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## MINING ENGINEERS AND MINING INSTITUTES.

Mr. J. D. Kendall, in a forceful article printed in this number of The Canadian Mining Journal, asks an exceedingly pertinent question. "Why," enquires Mr. Kendall, "should men who know their business, and are prepared to do it honestly, allow a large part of it to be taken from them by imposters who . . . are always ready to barter a favourable opinion for an approved monetary consideration, and who in doing so bring disgrace upon a profession which, when properly practised, is in the highest degree honourable? . . . The rooting out of imposters must, at all times, make for the benefit of a mining country generally."

The rooting out of imposters is left, in Canada, to the individual or to circumstances. Public sentiment is lax. Professional sentiment is uncrystallized. Hence Canada is a favorite hunting-ground for the fake mining expert.

Mr. Kendall recommends that every person practising as a mining engineer should be compelled, by law, to become a member of an institute to which admission shall be gained only by examination. Those eminent in the profession might safely be exempted from examination. But, in all ordinary cases, the requirements for admission should be as rigid and as exacting as possible. Persons practising before admission to the institute should be liable to a heavy penalty.

With the spirit of Mr. Kendall's proposal we are in hearty accord. The problem of elevating and regulating the profession of mining engineering in Canada is urgent. We are not sure, however, that we can go as far as Mr. Kendall indicates. Our Canadian Mining Institute is in process of change. Full membership is no longer attainable by the layman. But the present membership is miscellaneous. Hence, although the institute can concern itself effectively in many public questions, it must avoid the dangerous ground of professional qualifications.

A solution, however, has been suggested. Restrictions as to admission cannot be made retroactive. They apply only to the present and the future. But segregation can be effected within the institute, by the creation of a special professional section. This, properly managed, should be robbed of all invidiousness. It will not discount ordinary membership, but will place a definite meaning on special membership. And ordinary membership should be always a preliminary stage.

In this special membership should be included only those who can qualify under some such scheme as that outlined by Mr. Kendall.

We cannot refrain from citing here an instance that was brought to our notice not long ago. A young man, who can claim membership in several institutes, was engaged to write a report upon a cobalt-nickel property. That report was the most complete demonstration of ignorance and ineptitude that we have ever seen. We believe that it was written in all honesty; it is impossible to think otherwise. But as an exhibit of crassness, carelessness, and unfitness this precious document was the limit. This is precisely the kind of malpractice that is most disastrous to the profession. The fakir can be explained; the unfitness of the respectable practitioner cannot.

### A PERENNIAL PARADOX.

Attention has been drawn frequently to certain anomalies that exist in the methods of valuing the mineral products of Canadian mines and smelters. An outstanding example of discrepant methods is afforded by a comparison of the returns for Ontario nickel, as given respectively by the Ontario Bureau of Mines and by the Dominion Mines Branch. This discrepancy is noted annually in the Report of the Bureau of Mines; but, so far, there has been no attempt to reach a common basis.

As explained in the Bureau's Report, the Dominion statistics are based upon the average price of refined nickel in New York, while the Bureau's figures represent the value of the nickel in the form of matte at the point of production, "as given by the producers." The last phrase is significant.

The net result is that the Bureau's returns are little more than 20 per cent. of those of the Dominion. For 1908 the Bureau reports the value of nickel produced in the province as \$1,866,059; while the Dominion Mines Branch sets the value as \$8,224,180—a difference of \$6,358,121.

We have no reason to think that the former evaluation, \$1,866,059, is excessive. It takes account only of the nickel as matte, at point of production, and sets a value of about 9 cents per pound of nickel. On the other hand the Mines Branch calculates the nickel at 43 cents per pound. In other words, nickel ore mined and smelted in Canada gives a product worth approximately one-fifth of the price obtainable after the matte has been refined on the other side of the border.

The industrial magic, whereby the metallurgical product is enhanced five times in selling price by means of operations incomparably less costly than mining and smelting, arouses our interest. It is obvious, of course, that a restricted market may have much to do with fixing the price of refined nickel. But that difference of more than six million dollars can hardly be referred to market exigencies.

Certain international aspects of the nickel industry we are tempted to touch upon. But we shall refrain.

It will be sufficient to suggest that we would like to hear a just reason why part, at least, of the nickel produced in Canada cannot be refined here. Several Ontario manufacturing centres would welcome the opportunity of helping to produce that odd six million dollars.

### KENORA MINING NEWS.

Our Kenora correspondent, on another page, gives an interesting account of his impressions concerning the decline of gold mining in that once flourishing country. The usual causes, incompetent management and unlimited gold stealing, are believed to have been at the bottom of Kenora's failure. There appears to be ample evidence to warrant the statement that gold stealing assumed shockingly large proportions.

It is difficult for one who has no experience in gold or silver mining camps to credit the stories that are told.

But the history of rich camps is everywhere the same. Enormous quantities of Yukon gold were stolen under the very eyes of employers. Lurid tales, many of them amply substantiated, came from Goldfields, Tonopah, and Rawhide. Systematic and extensive high grading is practised in certain Australian camps. In South Africa, the misappropriation of amalgam and bullion is by no means uncommon. Hence it is not unreasonable to assume that there is a foundation in fact for the Kenora stories. As in Nova Scotia, where "high-grading" prevailed to an astonishing extent not long ago, the ores of the Kenora mining division contain frequent patches of beautiful specimens of native gold. Native gold makes a notably direct appeal to the wage-earner.

Undoubtedly gold stealing has been a serious drawback to the Kenora mines. But competent supervision should, and can, reduce to a minimum the possibilities of this illicit habit.

It would be an instructive experiment to place one of the old mines of the district in qualified hands and watch the results. An Ontario gold mine, run on its own merits, would be something of a novelty.

### PARLIAMENTARIANS AND FACTS.

It is unfortunate that the mineral industry has no representation in the Dominion House of Commons. Recently a Liberal member, Mr. Ralph Smith, in the course of a speech advocating the cause of technical education, made a wild reference to the number of fatalities in Canadian coal mines. Although Mr. Smith's statements were partly corrected by the Hon. W. L. Mackenzie King, they are calculated to leave a totally wrong impression upon his hearers.

Mr. Smith asserted that the rate of fatalities in Canadian mines is greater than in any other civilized country. This is incorrect. Nova Scotia coal mines,



owing largely to enlightened managerial policy, show the lowest death rate per million tons mined. British Columbia's rate has been excessive, but will be reduced when the use of safety-lamps is made compulsory. Alberta, where statistics are very loosely gathered, makes a fair showing.

The metalliferous mines of Canada are not adequately inspected. But, so far as can be determined, the death rate per thousand men employed, is lower than the rate obtaining in many districts in the United States. As regards the newer camps of British Columbia, Ontario, and Nova Scotia, where large numbers of small prospects are being worked, it is manifestly unfair to make comparisons. In well-organized and established mining centres the rate of fatalities will always be lower than in new districts.

Mr. Smith might well have urged that the Federal Mines Branch take up, as a regular duty, the prevention of mine accidents, the Dominion Government has been entirely apathetic in this respect.

#### OTISSE.

The suit brought by E. Kenyon-Stowe to set aside the sale of the Otisse mine to the Otisse Mining Company was thrown out by Justice Latchford on November 24th. Costs are to be paid by the plaintiff.

During the progress of the suit the Otisse mine has been steadily developed, since the owners were fortunately able to finance operations. Hence the obvious purpose of the plaintiff was defeated. He succeeded, however, in harassing and hampering the Otisse Mining Company for considerably more than a year.

The fact that irresponsible persons are permitted to institute mischievous litigation of this kind is a reflection upon our judicial system. The result of this suit discredited Mr. Kenyon-Stowe completely. This, however, is little consolation to those who have suffered from a protracted and groundless lawsuit.

#### EDITORIAL NOTES.

To our editorial comment upon Mr. Kendall's article we may add here our opinion that every mining engineer who joins the Canadian Mining Institute should give to the secretary a full record of his professional career. Further, it would be well to complete this record by annual additions. This would be one construction step in the "rooting-out" process to which Mr. Kendall refers.

An article that will reveal some startling figures as to actual cost of producing compressed air will shortly appear in The Canadian Mining Journal. It will be accompanied by a series of diagrams that represent actual tests made under working conditions in a leading Canadian mining camp. The name of the camp and

the identity of the mines where the tests were made are suppressed—for reasons that will be obvious.

Our two review numbers, January 1st and January 15th, will be worthy of attention. All the larger mining fields will be suitably dealt with and many new possibilities pointed out.

The closing year has been one of unprecedented activity. The number of foreign investments has rarely been exceeded. German, French and United States capital has come into Canada freely. English investors manifest less aloofness than heretofore.

The strike that is tying up Australian coal mines is having its effect on Canada. Enquiries for coal have reached Vancouver. It is probable, in the event of the strike continuing indefinitely, that orders will be filled at British Columbia collieries.

#### REPORT ON THE IRON ORE DEPOSITS ALONG THE OTTAWA AND GATINEAU RIVERS.

By Fritz Cirkel, M.E.

The iron ores of the valleys of the Ottawa and Gatineau Rivers have been the subject of an investigation by Mr. Fritz Cirkel, M.E., for the Mines Branch of the Department of Mines, and his report has just been published.

The publication of this report comes at a very opportune time, owing to the development lately assumed by the smelting of iron ores by electricity; for the region in question possesses great water powers, a part of which could aptly be applied to the establishment of an iron and steel industry.

After describing in detail various iron ore deposits in the townships of Hull, Templeton, Wakefield, Bristol, Grenville and others, Mr. Cirkel concludes that many of these would yield ores which could in all probability be treated profitably in the electric furnace. It is stated in the report that this method of reducing the iron ores can compete with the blast furnace for the production of pig iron, when electrical energy can be developed at a low cost.

All engineers and metallurgists interested in the iron and steel industry will read the report with interest, more especially the general conclusions, which are given from page 100 to page 107.

An appendix to the report gives a synopsis of the water powers, both developed and undeveloped, in the region under consideration. These data have been compiled from the latest authoritative sources available. The following falls can all be developed to produce large quantities of power: Pagan Falls, Cascades, Chelsea Rapids, Great Falls, Coulange River, Roche Fendue, Calumet Falls, Chats Falls.

The report is well illustrated by five plates, fifteen drawings, and two maps, and the whole forms a volume of 147 pages, which constitutes a valuable addition to the series of bulletins on the mineral resources of Canada issued, under the direction of Dr. Eugene Haanel, by the Mines Branch of the Department of Mines.



# MINING ENGINEERS AND MINING INSTITUTES

Advance copy of paper to be read before the Canadian Mining Institute.

By J. D. Kendall.

On more than one occasion I have tried to induce engineers to discuss this subject with the view to arriving at some general understanding and resolution as to the means necessary to place mining engineers in a position before the law, similar to that occupied by members of other professions.

Spencer has truly said "It is only by varied iteration that alien conceptions can be forced on reluctant minds". I therefore, return to the subject once more, knowing, however, that the conceptions are alien to some only, although the reluctance to deal with them seems to be almost general. Why it should be so I cannot understand. Why should men who know their business and are prepared to do it honestly allow a large part of it to be taken from them by imposters who, gathering in all new mining districts and sometimes old ones, are always ready to barter a favourable opinion for an approved monetary consideration, and who, in doing so, bring disgrace upon a profession which, when properly practised, is in the highest degree honourable? This, of course, I know is only an egoistic view, but from the altruistic standpoint the prospect is equally satisfactory. The rooting out of imposters must, at all times, make for the benefit of a mining country generally. To the persons who employ these imposters there would, doubtless, be a serious loss, or rather the sources of their illegitimate revenues would disappear, but that would be a matter for congratulation rather than regret.

The question then arises, how are these imposters to be weeded out. In my opinion it can only be done in one way. In every mining country an institute should be established by Parliamentary enactment, and every person practising as a mining engineer in any country should, after the expiration of his privilege, be compelled, under serious penalties, to become a member of the institute of that country, and gain admission to it by examination only, except in the case of men eminent in their profession in whose favour, for the first six months or so after the establishment of an institute the Examining Boards might dispense with the usual conditions of entry. Every candidate for admission should have to produce to the examiners at least two written testimonials as to character from persons who have known him intimately for at least four years. After the first six months of an institute's existence these testimonials should be from members of the institute. Any person practising before admission to the institute should be liable to a serious penalty enforceable by law.

Membership by the institute should be graded according to experience, and other qualifications, and the different grades should be indicated in such a manner that the public cannot possibly be misled as they are at present. I recollect the case of a man who some years ago in recommending a very wild cat to the public, wrote the initials "E.M." after his name. Later he was obliged to appear in a law court to support his recommendation, and was there asked if he was an Engineer of Mines. He said, "No, the letters in my case simply mean Expert Miner." A similar mis-

leading use of the initials employed by a statutory-formed institute to indicate membership should be made punishable by law.

The requirements of the Examining Board should be ethical as well as intellectual. I am convinced that our whole system of education is wanting in this connection. The ethical side of a man's mind is not cultivated to anything like the extent it should be. A knowledge of right conduct no more grows with us than a knowledge of right geology. Besides the general rules of conduct, which ought to be taught with the three R's, there are rules of special application to the different walks of life. Some of these, so far as they effect the mining engineer, were referred to in a previous communication. They should be made rules of the suggested institute, and their infraction should be made punishable by removal from its rolls. They should, moreover, form part of an engineer's education, and not be left for him to find out in later years after he has unwittingly done some of the mischief to which their non-observance will surely lead. Engineers are frequently offered contingent fees which, I need hardly say, should always be refused unless the contingency be legitimate profit to their employers. Young engineers are often greatly puzzled to know what to do under the circumstances, such matters never having been dealt with in their training, as they ought to have been. I remember a case in which a well known person went into a young engineer's office for the purpose of obtaining a report on a property he intended placing before a company of which he was a director. He said, "I am not sure that I can sell the property, so I want to make an arrangement with you something like this: If I don't sell the property I shall give you fifty dollars for your report; if I do sell it I shall give you fifteen hundred dollars". The young engineer very properly declined this offer, saying, "My charge will be two hundred and fifty dollars whether you sell or not". Think of the inducement there is in such an offer to produce a favourable report, and the necessity of pointing out to students the true inwardness of such offers must be at once conceded.

I have purposely refrained from loading this communication with the many illustrations which might be adduced to show the necessity for the suggested changes, because there must occur to the mind of every engineer of experience many such illustrations. Can anything conclusive be urged against the proposed changes? If not, I hope this institute will take the lead in what I, and others with whom I have spoken, consider to be a much needed reform, and establish itself on the lines indicated, or some similar lines which will give its members and the mining public that protection from the operating of the "Yellow-legger", and the unprincipled promoting they so much need. Much can be done by such an institute in the way of exposing, and thereby putting a stop to, the crooked methods of the latter, that individuals, however courageous, could not afford to do.

It is not for a moment thought that any or all of the suggested changes would place engineers on one plane



of efficiency. Differences must always exist so long as variation and environments are factors in organic evolution. But with the suggested reforms we should have engineers and engineers. Now we have engineers and fakirs.

The institute advocated, which might be called the National Institute, need not in any way interfere with the local or Provincial Institutes which are so

necessary for the reading and discussion of papers, but if the publication of the papers were undertaken by the National Institute, the reduced cost would, to some extent, if not entirely, effect the diminished revenue, for the number of members would certainly be reduced under the proposed scheme. But I think engineers would readily agree to an increased subscription in consideration of the protection they would obtain and their improved position generally.

## THE NORTH THOMPSON VALLEY, B.C.

By J. C. Gwillim. \*

The recent election campaign in British Columbia has brought to the front a railway route that will pass through a little-known district, but a district that at one time promised to be on the main line of the C.P.R.

This is the valley of the North Thompson River, which cuts diagonally from near the great depression west of the Rocky Mountains proper at Tete Jaune Cache into the heart of the great central plateau at Kamloops. Thus it avoids crossing the Selkirk ranges met on the main line of the C.P.R. and Crow's Nest railway.

The Grand Trunk Pacific, issuing from the Yellowhead Pass of the Rocky Mountains proper into the same great valley as the proposed C.N.R., will follow another diagonal valley, the valley of the Fraser, and so reach the central district of Fort George without crossing the usual summits of the ranges west of the Rocky Mountains proper.

Both railways expect to reach the Pacific coast with a maximum grade of four-tenths of one per cent. by using the low pass at Yellowhead and, one going south-west while the other goes north-west, reach the ports of Vancouver and Prince Rupert respectively.

The proposed C.N.R., after emerging from the Rocky Mountains at Tete Jaune Cache, will pass down the great open valley southwards to Canoe River 16 miles, thence over the low pass to Albreda River, down this river to its junction with the North Thompson, 48 miles, thence along the narrow valley of the North Thompson, through the "wet belt" of cedar, hemlock and devil's elms, into the dry, more open country of the interior plateau 100 miles north of Kamloops; thence, still following this more open valley, to its junction at Kamloops, a total of 240 miles from Tete Jaune Cache.

Yellowhead Pass at one end of this district and Kamloops, or old Fort Thompson, at the other end, each has a history dating back to the fur-trading days early in the last century. For David Thompson, the explorer and trader, according to Mr. J. B. Tyrrell's "Life of David Thompson," passed through Yellowhead Pass on his way from the plains to the newly-established ports on the Kootenay and Columbia in 1810, while Fort Kamloops, according to Father Morice's "History of the Northern Interior of British Columbia," existed prior to 1821 and was on the route for supplies from the lower Columbia to the posts on the upper Fraser River.

But the great narrow valley of the North Thompson

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between them was a solitude, first travelled and described by Milton and Cheadle in their memorable journey of 1863, and a few years later by Dr. Selwyn, the C.P.R. surveyors, and the late Principal Grant.

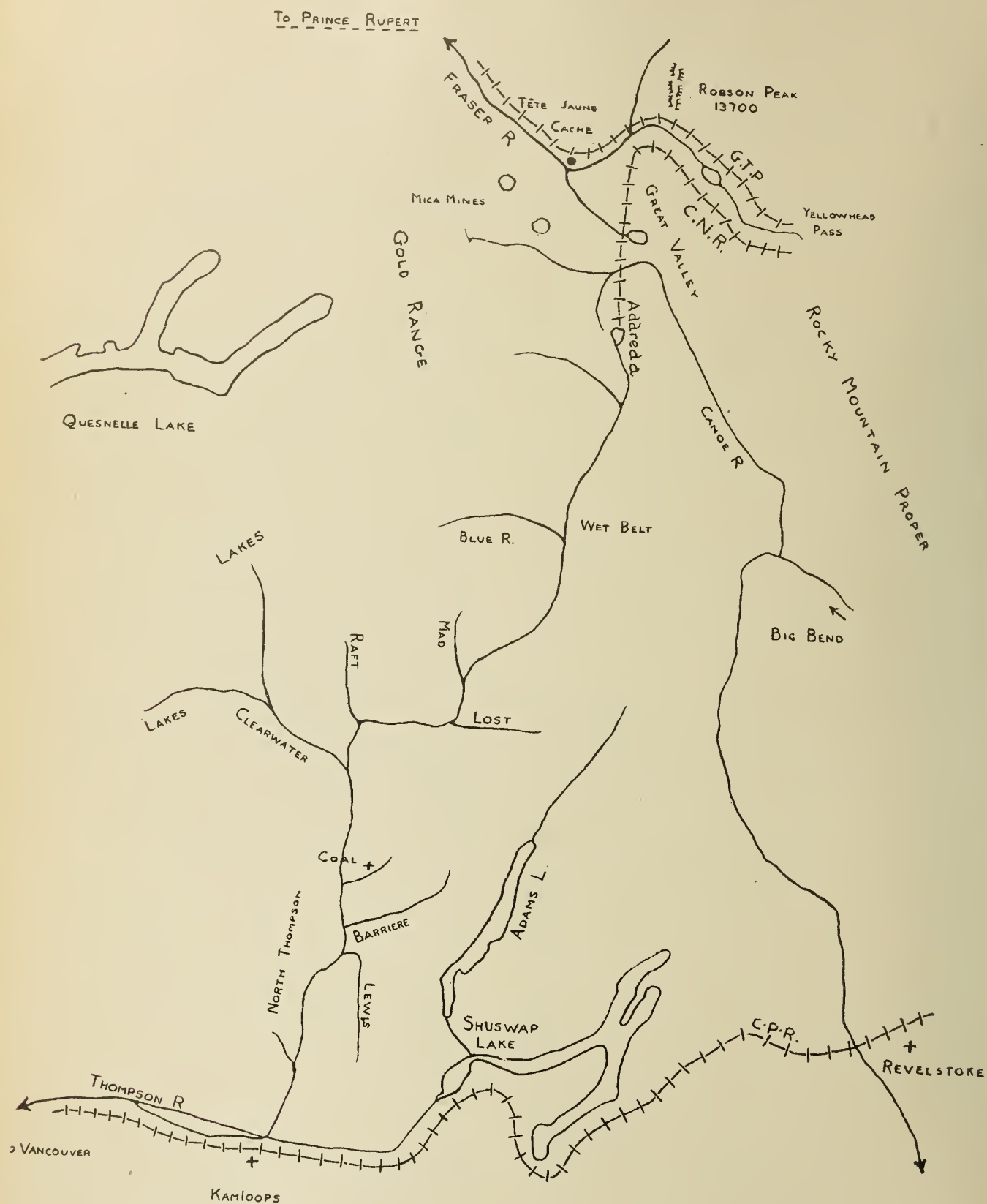
This account gives little information beyond references to various local features of the topography and the obstructive character of the vegetation, such as the presence of the "devil's elms" or "aralea and the gloomy forest," as Dr. Selwyn described it when he traversed it eight years later in the opposite direction.

In 1871, Dr. Selwyn, then Director of the Canadian Geological Survey, made an expedition from Kamloops to Tete Jaune Cache and "Leather Pass"—a trip which took him nearly two months. Finding the main valley of the North Thompson too toilsome, at a point 105 miles above Kamloops, he ascended the plateau country to the west of it, returning to the main river at a point 45 miles further on. Thence he followed the Thompson and Albreda to the great valley at the Cache. At this time, 1871, the C.P.R. was active in exploring various routes between the Fraser River and the plains. For several years they pushed forward this location along the North Thompson until it was abandoned for the present route of the main line through the Selkirks, located by Major Rogers. However, the surveyors left a good trail with bridges and camping places, at one of which, Canoe Landing, is recorded on a board:—"F. A. Hassaek and John Dillon, Camp 1871, C.P.R.S."

This trail is now overgrown with brush, and most of the bridge work is gone, yet it is still passable for the few who come that way. Otherwise the valley, beyond the few scattered ranches, has lapsed into solitude, until now, after nearly thirty years, a second generation of railway locators invade it.

During the interval a number of expeditions have been made from Kamloops to the mica mines of Canoe River and Mica Mountain, a few miles south-west, and west of Tete Jaune Cache, a journey of about 15 days by pack train.

As early as 1852, Bancroft, in his history of British Columbia, records a report of placer gold being found on the Thompson, and in 1857, Chief Trader McLean, of Fort Kamloops, sent to Fort Victoria for iron spoons to scrape the gold from the bed rock crevices. It was in 1858 that California miners first worked the bars of the lower Fraser River leading up to the discovery of Old Cariboo, which resulted in the sad hardships of some gold-seeking emigrants, who, in 1862, attempted to reach them overland by way of Yellowhead Pass and the upper North Thompson.



SKETCH MAP OF NORTH THOMPSON RIVER

SCALE IN MILES 0 10 20 30 40



Principal Grant, passing through Yellowhead Pass with Sir Sanford Fleming, then Chief of Location for the C.P.R., attributes the name of this pass to an old Iroquois hunter who cached his furs at the great valley of Tete Jaune Cache until he was ready to pack them over the Pass to Jasper House on the Athabasca. His hair being of a light colour gave the place its name. Another story is that it was named after a yellow-haired packer of the Hudson Bay Company who made this place a depot on his way from Fort George on the Fraser to Henry House on the Athabasca. Be that as it may, there is, or was, one lonely family group of Indians permanently encamped at this place who might well be descendants of the original Iroquois "Tete Jaune," save the yellow hair, which is not possessed by "Old Moy-ees" or any of his family.

The earliest account of a traverse from the "Cache" to Kamloops seems to be that very bright chronicle of the Milton and Cheadle expedition, "The North-west Passage by Land," made in 1863. These valiant travellers had a most troublous time and would likely have perished but for the resource of Mr. and Mrs. Assiniboine, Stoney Indians, who accompanied them.

For 100 miles up the climate is fairly dry, the valley lightly wooded, and dotted with open spaces and bunch grass. A few isolated ranches and some fair-sized patches of fertile land exist along this distance, after which the wet belt is reached. Thence with few exceptions the valley is narrow, rocky, and heavily timbered with hemlock, cedar, and other vegetation

of a wet country, until the great open valley near the Cache is reached. At this point the rain- and snow-fall is light, and a heavy growth of grass is observed. This is a place that for many years has been considered good wintering ground for horses, where there is a larger tract of land fit for agriculture than elsewhere on the route.

Concerning the timber resources, there is much heavy cedar in places, and there may be extensive areas on some of the tributary streams; but riding along in the narrow, gloomy valley one does not see far afield.

The most extensive meadows or valley lands are at the Indian Reserve, 50 miles north of Kamloops; Stillwater Flats, 125 miles; and Blue River Meadows, 155 miles up the river. Otherwise there are a few small areas and benches; but for much of the way the valley is, as Dr. Selwyn says, remarkably deep-cut and narrow for so large a stream.

At the Indian Reserve, on Coal Creek, 50 miles from Kamloops, there is a small area of coal strata, similar to the Nicola in age and quality of the coal. The seams exposed are thin. A section given by Mr. McEvoy, in 1894, is:—

|                         |                          |
|-------------------------|--------------------------|
| Coal—6 inches.....      | Hygroscopic water, 2.22% |
| Sandstone—2 feet.....   | Volatile Comb. 32.05%    |
| Coal—9 inches.....      | Fixed Carbon, 52.81%     |
| Sandstone—6 inches..... | Ash, 12.02%              |
| Coal—18 inches.....     |                          |

Some of this coal has been taken on scows or boats to Kamloops, and is well spoken of.

(To be continued.)

## CANADIAN AND ENGLISH COMPANY LAW.

(A continuation of the discussion that appeared in our issue of November 15.)

A letter of an English correspondent of The Financial Times, of London, England, that was published by our contemporary on September 1st, was reprinted in the Canadian Mining Journal of November 15, along with a reply from Mr. J. J. Harpell. The Times' correspondent asserted that there exists in Canada no such legislative control of company promotion as is maintained in England. Mr. Harpell, replying to this, pointed out that the Ontario Companies Act is much more rigidly enforced, especially as regards mining companies, than is the English law.

In The Financial Times of October 29th the anonymous correspondent takes exception to certain of Mr. Harpell's statements, and asks some leading questions. These questions Mr. Harpell answers completely in the letter reproduced here.

We are compelled to remark that The Financial Times' correspondent displays not even a casual acquaintance with Canadian company law. He has arrived at his conclusions without taking the trouble to glance over even the Ontario Act on which he has so much to say. Moreover, his knowledge of the English law is certainly superficial and inaccurate.

We do not choose to pose as apologists of Canadian business morals, beyond remarking that the worst Canadian examples of business turpitude flourish better in foreign lands than on their native soil. Canadian company laws are patently defective in some respects.

But, despite all talk of Somerset House, we believe that our legislative machinery does not suffer unduly by fair comparison with that of the Mother Country. Fair comparisons, however, cannot be expected from a writer who rushes into print totally misinformed or uninformed, or both.

This particular kind of Pharisaism we cannot and need not tolerate. Grave abuses exist in Canada, as in every prosperous and exploitable country. The man who is brave enough to point these out, whether he be a Canadian, an Englishman, or a Turk, we respect. But the destructive critic must, above all things, make sure that he is well and truly informed. Slipshod, acidulous, and vain generalities do nothing but harm. They cannot remedy abuses, because they are aimed at wrongs that do not exist.

But the reader may judge for himself:—

From The Financial Times, October 25th.

### CANADIAN COMPANY LAW—HOW IT DIFFERS FROM ENGLISH LEGISLATION—REPLY TO CRITICISM.

(From a Correspondent.)

On 1st September The Financial Times published an article by the writer dealing with the over-capitalization of Canadian companies and defects in the Dominion and Provincial Companies Acts. The article was



written for the purpose of giving information to British people who are investing largely in shares of companies of Canadian origin and administration and sounded a note of warning, such as it is the peculiar province of a paper like the Financial Times to give to its readers. Naturally the article has provoked much resentment in many interested quarters and has evoked considerable hostile newspaper comment, as was to be expected. Editorially, a London financial paper remarked that "in the case of a young and growing country it is inevitable that much latitude should be allowed to individual enterprise." This is undoubtedly true, but that such latitude should extend to the Directors and promoters of Canadian companies in dealing with other people's money is a matter on which British investors in these companies are entitled to hold strong opinions. As was pointed out in the former article, Canadian Directors have not come to realize, as a class, that they are trustees for the shareholders in a company, as well as for the "controlling interest" in any company. When the law confers the privileges of incorporation and limited liability upon a company in England it, so to speak, constitutes the new entity its ward and carefully supervises the proceedings of its trustees, the directors.

### The British Investors' Standpoint.

Such is not the case in Canada, where the controlling interest is supreme and the controlling interest is usually in the hands of the promoters. It may be urged with considerable truth that the promoters of an enterprise are usually the persons most capable of managing it successfully. On the other hand, it is the fact that there are Canadian companies in which British investors are interested where the interests of the promoters—that is, the controlling interest, otherwise the Board of Directors—are not in harmony with the interests of the minority shareholders, British or Canadian. Take the case of a large corporation that forms several subsidiary companies, the shareholders in each of these being different, but the "controlling interest" the same. The smaller companies will probably be managed entirely in the interest of the larger concern, regardless of the shareholders in the smaller company. The idea in general in Canada that if a British investor gets anywhere from 3½ to 5 or 6 per cent. for his money he ought to be entirely satisfied and ask no questions. But what of the large profits made by the Canadian promoters who have contributed little or no money towards the cost of such enterprises? The state of the Canadian company laws permits these undisclosed profits to be concealed beyond the hope of finding out by any shareholder. Of recent years the whole force of English company law has been directed towards compelling the most complete disclosure of contracts, antecedent to the formation of a company, which might in any way influence an investor in taking or refusing to take shares in such company, and such contracts are on file, so that "he who runs may read." Such is not the case in the Dominion of Canada. However, nearly all the shares in Canadian companies that are sold in England pass by transfer and not by original allotment, consequently the transferee takes them with the same knowledge as the transferor had. Of course he has not actually got this "knowledge," but in accepting the transfer he is assumed to have it, which amounts to the same thing.

### Cobalt Flotations.

In The Financial Times of Saturday last there was a letter from Mr. J. J. Harpell complaining that the writer of the article of 1st September had "done much injustice to Canadian people and to many of their laws and institutions." Mr. Harpell then goes on to state that "it would be a great mistake to leave your readers under the impression that Canadian company law has not been modelled after similar English legislation, because nothing could be further from the truth." On the other hand is the deliverance of your financial contemporary, already referred to, who in criticising the aforesaid article gave the valuable opinion that the Canadians, being wise in their generation, had adopted in their legislation the best points in both English and American company law. As there are now nearly fifty States in the American Union, and each has its own special company laws, the framers of Canadian legislation must have had a wide fund of information to draw upon. Had space permitted, allusion would have been made in the former article to the attempt made by the Ontario Government and Parliament to reform the company law of that province. This was brought about by the absolutely scandalous state of affairs in Toronto in the way of company promotion at the time of the Kootenay boom in the closing years of the last century. It is to be feared that a not much better state of things exists at present when one reads in the Toronto papers that Cobalt claims—"claims," and not "mines," is written advisedly—were incorporated as public companies in one week for an aggregate sum of no less than \$16,000,000. The smallest of these capitalizations the promoters, with modest assurance, placed at \$1,000,000.

### Differences in Canadian and English Law.

Mr. Harpell says that "The Companies Act of Ontario is almost an exact replica of the English Act of 1901, with one or two very important amendments." Will Mr. Harpell state that the Ontario Act prohibits the issuance of shares at a discount or the giving of shares to directors to qualify them? Does it prescribe a minimum subscription upon which a company can go to allotment? Mr. Harpell says that all the information available about English companies at Somerset House can be found in a similar way at the Provincial Secretary's office in Toronto in regard to companies incorporated in Ontario. Not very long ago the writer had occasion to make a search at the Ontario Provincial Secretary's office in regard to an important company incorporated in the province and doing business outside the Dominion, and all the information he could get "didn't amount to shucks"—nothing like the returns that are compulsorily filed at Somerset House. In the search made by the writer the main object was to peruse any contracts or agreements made antecedent to the incorporation of the company in question. Nothing of the kind was to be found, though there were some details showing the date of incorporation, names of the incorporators and details of capitalization, all of which had already been obtained from the files of a Toronto newspaper. Mr. Harpell is, no doubt, familiar with the letter of the Ontario company law, and the writer is not, but he has had considerable experience of its operation. He has also some experience of the Dominion Acts and special Charters, as well as those of several of the provinces, and has no hesitation in repeating the warning given to British investors in the article of 1st Sep-



tember that before buying into Canadian companies they should ascertain (if they can) whose shares they are buying, what cash has been paid into the treasury of the company from sales of shares, and for what consideration, if any, the shares were originally issued.

### Evil of Over-Capitalization.

Mr. Harpell, in the second half of his letter, after commending your correspondent for his criticism of the over-capitalization of the Canadian electric power companies, goes on to say: "Almost every conceivable commodity in Canada is being syndicated and capitalized to an extent that is forcing up the cost of living and production to a point where the prosperity and development of the country are being threatened." In this he is quite correct, and the cause is to be found in the laxity with which the various Companies Acts are framed and administered. If adequate disclosure of every company's affairs were compulsory, and a sufficient ad valorem tax placed upon all share capital issued for anything except cash at full par value, or its legitimate equivalent, the monstrous over-capitalization that has been going on would cease. The writer has been accused of dealing in "vague generalities," but it would be easy to cite particular cases. They are well within the knowledge of every Canadian, but it would be invidious to name one or two where many Canadian companies are in the same boat, and when their operations are perfectly legal and meet with the approval of the commercial communities in which they are domiciled. This much may be said: These enormous over-capitalizations, if attempted here, would shock the commercial conscience of England and become impossible of accomplishment. That is why it was written in the former article that the commercial morality of Canada is patterned upon the United States rather than upon Great Britain. Mr. Harpell himself shows how Canada is following the lead of the "Land of Trusts" rather than in the footsteps of the Old Country, and to that extent exonerates the writer from making any imputation against the people of Canada, for whom he has a great regard and admiration. If, however, some of the leading Canadian business men conduct their operations on the lines of high finance in the United States, it is the duty of influential English papers to draw attention to the fact, for, after all, it is money subscribed by the British public that provides the cash basis upon which many Canadian companies have built up monstrous super-structures of share capital unrepresented by any asset save the commercial astuteness and assurance of the promoters and their associates.

### MR. HARPELL'S SECOND LETTER IN REPLY TO THE ABOVE.

To the Editor of, "The Financial Times" London, Eng.

Sir,—There are a few points raised by your correspondent in his communication that appeared in the Financial Times of Oct. 29th, which require answering. Further than replying to these I have no desire to prolong the discussion. It has been sufficiently demonstrated that if avaricious and reckless promoters choose to charter Limited Liability companies in Canada and sell their securities in England, no greater blame can be attached to the people of one country than to those of the other. This is particularly so when both countries have shown themselves equally desirous of curtailing and of stamping out this sort of thing

by the best legislation they can conceive. Furthermore, as I have pointed out in my former letter the losses sustained by the over-capitalization of these companies are not borne altogether by the investor. In so far as they have been able, these companies have compelled the Canadian consumer to pay a price for their products that would enable them to earn the dividends promised the English investor. For this reason, if for no other, the people of Canada are just as anxious to expose and punish the perpetrators of this kind of fraud as are the people of this country.

In the course of his article your correspondent writes as follows,—"Will Mr. Harpell state that the Ontario Act prohibits the issuance of shares at a discount or of giving shares to directors to qualify them? Does it prescribe a minimum subscription upon which a company can go to allotment?"

In answering these questions the writer has before him copies of both Acts. So far as he can discover the English Act makes no mention of issuing shares at a discount. It does not seem either to permit or to forbid it. On the other hand the Ontario Act permits it in the case of mining companies only. But in Section 141 the Ontario Act states that "No shares shall be issued at a discount unless authorized by a by-law of the company confirmed by a majority of the shareholders thereof——." A copy of this by-law must be filed in the office of the Provincial Secretary and on each of the share certificates of such a company the words "No Personal Liability" must be distinctly written.

As regards the giving of shares to directors to qualify them, both the English and Ontario Acts permit this. But both also require that the prospectus shall state full particulars of the nature and extent of the interest (if any) of every director in the promotion of or in the property proposed to be acquired by the company with a statement of all sums paid or agreed to be paid to him in cash or shares by any person either to induce him to become, or to qualify him as, a director. This is verbatim Sec. 99 Sub. Sec. 1 (m) of the Ontario Act as well as Sec. 10 Sub. Sec. 1 (n) of the English Act.

Again, neither the English nor the Ontario Act prescribes a minimum subscription upon which a company may go to allotment. But both are equally exacting in requiring that this be set forth in the articles of incorporation and that if it is not so stated the company cannot go to allotment until the whole capitalization is subscribed. Both Acts also require, in the following words, that the prospectus "must state the minimum subscription on which the directors may proceed to allotment" Sec. 10 Sub. Sec. 1 (d) of the English Act and Sec. 99 Sub. Sec. 1 (d) of the Ontario Act.

In a recent issue of "The Accountant" the following reference to this section of the English Act occurs:—"Although Sec. 10 Sub. Sec. 1 (d) of the Companies Act provides for a minimum subscription to be stated in the prospectus, there is no regulation as to the ratio it should bear to the nominal capital, and in a recent registration the minimum subscription was fixed at £100, while the potential capital reached £70,000. It may be very difficult to draw a hard and fast line in this matter, and the draftsman of the Act may have been under the impression that cases such as we have illustrated would carry their own condemnation by such a bare-faced evasion of the spirit of the measure; yet it is not easy to see wherein lies the benefit of the Sub. Sec. in the absence of any limit."



You will notice, sir, that neither in this nor in my former letter have I made any attempt to exonerate or defend the excessive flotation of private Canadian companies. My only desire in writing is to disassociate the Canadian people from the promoters of this sort of thing, and to point out that the Companies Act of the Province of Ontario which is modelled after your own English Act, is even more effective than the latter in protecting the public from fraudulent flotations. If the English Act required, as does that of Ontario, prospectuses and advertisements of foreign companies to disclose as many material facts as is required of the

prospectuses and advertisements of home companies there would not be so many offering their securities in this market, and much would be done to protect the English investor from the losses that he will undoubtedly suffer. It would be interesting and, no doubt, instructive to know to what extent the English Companies Act is responsible for the large foreign investments of English capital, as compared with the amount that is being invested in local securities.

I am etc.

J. J. Harpell

## PRACTICAL HINTS IN THE PRECIPITATION OF SILVER FROM CYANIDE SOLUTIONS

by R. B. Lamb\*

The precipitation on zinc shavings of silver from cyanide solution is a function of the richness of the solution. The success of the precipitation and recovery of the bullion depends largely on this very important factor. The richer the solution in silver, the more easily precipitation is effected, and the simpler the subsequent recovery operations become. It is therefore important in the manipulation of cyanide solutions, before passing through the zinc boxes, for the metallurgist to arrange the flow of his solutions in such a way that the values are concentrated in a given amount of solution, or at least, in a certain or certain solutions before passing through the zinc boxes. When this method is employed, precipitation gives little or no trouble and a higher grade zinc silver product is obtained. With very high grade solutions in many instances 75 per cent. or even 85 per cent. of metallic will be found in the zinc silver precipitate, and the precipitation will occur almost wholly in the top compartments of the box. The consumption of zinc is much less on high grade solutions, and the deposition of base metals and minerals does not take place to such an extent, particularly in the top compartments of the zinc box.

It is no longer the best practice to move the zinc of the bottom compartments to the head of the box in filling with new zinc. The zinc should be disturbed as little as possible, and sufficient new zinc put into the compartments, the corners and sides, being packed firmly, but not tight enough to cause channelling, and the new zinc being placed on top of the old. This should be attended to daily with as little disturbing of the zinc as possible. Every compartment should be gone over carefully and repacked daily.

Instead of moving the zinc from bottom to top, it is far better to depend upon the manipulation of the solutions, aiming to get a high grade solution that will give the successful precipitation desired by the metallurgist. At all times this method will give a higher grade of precipitate than will result from distributing of zinc from bottom to top.

The most important item in precipitation by zinc shavings is to have an ample zinc box capacity. Certain features of construction must also be carefully

attended to. The box should be constructed in such a manner that the flow of solution from the head to the tail of the box will be very sluggish and uniform. There should be no currents or channelling through the zinc. To obtain this result the width of each compartment should be not less than 18 inches. It should have a depth no greater than the length of a man's arm. The length of the box and the number of compartments will depend on the volume of solutions that have to be run through in a given time. The width of the box will depend on the individual taste of the operator. A single unit box should be of such width that a man on each side of the box can work comfortably and clean up. A double unit box must be constructed so that one man can clean up from one side. The space underneath the screen upon which the zinc shavings rest should be not less than four inches deep on one side, tapering to from 8 to 12 inches on the other side. The bottom of each compartment should be connected to the common launder by means of a plug or valve, preferably the former.

In present practice the zinc shavings should not be washed outside the box. To permit of this the compartments of the box should be of ample capacity, and should receive a small moveable trommel which is set up in the first compartment of the zinc box where the clean-up begins, and the washing should be done in the solution of the box itself. After all the compartments of the box have been washed in this manner by moving the trommel into each compartment successively, the washings carrying the silver zinc precipitate are run out through the launder to the clean-up tank. The compartments of the box are then thoroughly hosed out, the box filled with water, and the zinc returned.

It is unnecessary to describe the method of filling the box, as every metallurgist is acquainted with this procedure. The washing of the zinc boxes should be conducted once or twice, and with rich ore, possibly four times a month, and the resulting product should be collected in the clean-up tank. It is unnecessary also to describe the method of recovering the zinc silver slime from the clean-up tank. Either decantation or filtration may be used, the object of either method being merely to get rid of surplus water.

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Although it may be used with advantage in many cases, it is not essential to use the acid method of refining, silver being too cheap a metal for this process. In some silver cyanide problems where the ore is particularly free from base metals, and the precipitation has been conducted by the metallurgist in a way that gives a high grade precipitate, it will be found that smelting with borax is the only refining operation necessary. The amount of borax used is for the operator on the plant to determine, but it should not run over 40 per cent.. It is quite unnecessary to dry the precipitate. In cases where a little base metal is present, it is sufficient, providing the solutions have been comparatively high grade, to melt the moist precipitate with borax, soda, sand, and 2 per cent. nitre. A tilting furnace of the Monarch type should be used; the precipitate should be charged into a nearly cold pot, and the melting should be pushed rapidly with a good hot fire to finish.

For refractory precipitates to prevent roasting and incidental loss, I give the following method, bearing in mind that silver precipitate at most plants will not stand roasting on account of silver losses, and the low price of the metals:—

Place moist precipitate in a large iron pan, and add water up to from 30 to 50 per cent. of the total weight. Add, as fluxes, borax, soda, and 2 per cent. nitre. The borax and soda should be kept to the minimum that will permit of good refining. Add a very small proportion of glass powder or fine sand; mix the fluxes with the precipitate in the pan, and shovel the mixture about well. It will be found that this product resembling in physical appearance a soft mud, can be melted without roasting. Moreover, fluxes are utilized to better advantage, the base metals are more easily got

rid of, and the pots will stand longer. Use a somewhat slow fire to start, rapidly increasing the heat to a hot and strong finish. After pouring, allow the charge to cool thoroughly before disturbing. Should the precipitate contain arsenic, antimony, or other base metals, or if lead acetate has been used in the treatment, there will probably be a matte or speiss, or a mixture of speiss and alloy of lead and antimony or other base metals formed on top of the bullion. If the button does not break off clean after a proper length of time for cooling there is a certain amount of alloy formed on top of the silver. The best way to deal with this is to remelt the bullion from the entire clean-up in a hot furnace and pass a current of warm air free from excess in moisture, through the molten bullion to oxide the base metal. Finish up with nitre refining flux. This flux should be made of borax, soda, and 5 per cent. nitre. It should not be added until the bullion has been formed, the slag removed, and the bullion remelted or the entire charge skimmed without pouring. By this method there will be practically no silver losses in refining, and the resulting bullion should not be less than 950 fine if the operation has been carried out by a careful manipulator. With a little patience it can be sent away from the plant 990 fine, or better, without adding to the cost of plant refining. I do not recommend roasting silver precipitates for the elimination of base metals, except possibly in a few exceptional instances. The method given above is the best that is known at present. It will be found on a little practice that the silver clean-up can be accomplished with a very small percentage of flux. The total percentage of flux on the method outlined should not exceed 50 per cent. the weight of the precipitate smelted for comparatively low grade precipitates, with corresponding less amounts for higher grades.

## REPORT ON THE WHITEHORSE COPPER BELT YUKON TERRITORY

By R. G. McConnell

Issued by the Geological Survey Branch, Department of Mines, Ottawa—Abstract Prepared for the  
Canadian Mining Journal.

(Continued from last issue.)

### Ore Bodies and Ores.

The outcroppings of the Arctic Chief ore body at the surface, consist of a long lens of nearly solid, practically unoxidized magnetite, stained in places with copper carbonates. The hard surface section is grooved and striated by ice. The oxidized upper portion, if any existed, was removed during the glacial period, and since then little alteration has taken place.

The ore body, as defined by the workings in the main level 65 feet below the surface, consists of a mass of magnetite, approximately 190 feet long, and from 25 to 40 feet in width. The mass is fairly regular in outline, but curves gently away from the granite contact, towards the west. Small parallel lenses have been disclosed by the workings at two points.

Little is known of the ore body below the main level. A centrally located shaft, 50 feet in depth, followed ore

for 25 feet, then passed through altered diorite. A short drift to the north, from the foot of the shaft, penetrated mixed ore and altered rock for a few feet, and then entered limestone. A lens of well mineralized magnetite was encountered in a short cross-cut from this drift to the right, following the lime-diorite contact; but the work done was insufficient to show whether this represents the downward continuation of the main ore body, or the upper part of a new lens. A cross-cut to the left, along the lime-diorite contact, led to the discovery of a vein of rich silver-bearing tetrahedrite. The vein varies in width from a few inches, to a couple of feet, and had been followed about 40 feet, at the time of my visit. It does not appear on the surface, and this mineral is not known elsewhere in the camp.

The main magnetite lens of the Arctic Chief is enclosed directly between altered granite and crystalline



limestone, at its eastern end only. The western portion of the lode bends away from the contact, and has developed entirely in limestone. Where the lode adjoins the granite, it is bordered by a zone of mixed ore, and diorite, largely replaced by secondary minerals. In the limestone it is more sharply defined, the dark magnetite usually ceasing abruptly against a wall of white limestone, either pure or containing only a few scattered grains of iron. Horseshoes of nearly pure iron occur in the magnetite, and tongues of magnetite occasionally penetrate the lime for a few feet.

The magnetite varies greatly in texture, often passing in a short distance from a fine close-grained condition to a coarsely granular one. In certain areas, especially near the boundaries, the grains are separated by a soft serpentinite mineral resulting from the hydration of secondary augite and actinolite. Clinoclase is also present, in places, in considerable quantities.

The principal economic minerals associated with the magnetite are the two copper sulphides, bornite and chalcopyrite. They occur in about equal quantities. They are distributed in grains and small patches throughout the whole lode, but are more abundant in some areas than in others. They occur both in separate grains and bunches, and are intimately intergrown.

Copper minerals, resulting from the alteration of the sulphides, are less plentiful at the Arctic Chief than at most of the other mines. The two copper carbonates, malachite and azurite, occur in small quantities at the surface and along the walls, but are seldom found in the interior of the lode. Cuprite, the red oxide, also occurs sparingly along the walls, and is usually associated with small quantities of native copper.

The iron sulphide, pyrrhotite, is occasionally found at this mine, in small masses enclosed in magnetite. The common zinc sulphide, sphalerite, also occurs, but is comparatively rare. No pyrite was observed.

The gold and silver values in the Arctic Chief are important. Assays invariably show gold in some quantity, the tenor ranging from traces, up to over two ounces per ton; and the whole lode probably averages over \$4 to the ton. The gold values are not influenced by the copper percentage, since ores high in copper, often carry light values in gold. Specks of native gold are occasionally found, both in the ores and in the crystalline limestone. The silver tenor of the ordinary shipping ores averages about two ounces per ton; and assays of 147 ounces to the ton have been obtained from the tetrahedrite vein in the lower level.

The average copper percentage of the Arctic Chief lode is difficult to estimate, but probably exceeds 4%. A selected shipment of 140 tons, made in 1904, gave returns of 0.39 ounce of gold, 2.5 ounces of silver, and 7.22% of copper. A shipment of 83 tons, made during the past season, yielded 0.18 ounce of gold, 2.00 ounces of silver, and 5.37% of copper.

The following partial analyses of Arctic Chief ores were made at the Ladysmith smelter:—

|     | Au       | Ag        | Cu    | SiO <sub>2</sub> | Fe     | Al <sub>2</sub> O <sub>3</sub> | CaO  |
|-----|----------|-----------|-------|------------------|--------|--------------------------------|------|
| (1) | 0.09 oz. | 2.45 ozs. | 8.13% | 8.60%            | 44.84% | 15.78%                         | None |
| (2) | 0.08 oz. | 1.12 ozs. | 3.57% | 6.60%            | 53.20% | 13.28%                         | None |

Claims in the vicinity of the Arctic Chief, developed to some extent, include the Whitehorse, Golden Gate, the Suburban in the Corvette group, and the Verona.

The two former belong to the same company operating the Arctic Chief, and extend southward from it. They are situated in a granite area, destitute, as far as known, of limestone inclusions. The croppings on both claims are similar, and consist of partially decomposed

granite, or diorite, seldom more than a few feet across, stained with iron and copper. Quartz, calcite, white mica, and chalcopyrite, are the principal minerals present. The workings consist of a few shallow pits.

The Suburban is situated east of the Arctic Chief, on a valley branching off from McIntyre Creek. The lime-granite contact line passes through it, and is well exposed in the steep southern bank of the valley. The contact here is very sharp, and nearly vertical. The bordering granites are not mineralized, and are comparatively fresh. The limestones near the contact are altered mostly into fine-grained magnetite and serpentine, stained with copper carbonates. The altered zone has a width of 4 feet, and is followed by 6 feet of limestone, beyond which is a second, narrow, copper-stained bed.

North of the valley the contact is bordered by a narrow garnetized band, containing some bornite, chalcopyrite, and magnetite. A shaft 50 feet deep has been sunk on the deposit.

The Verona, northeast of the Arctic Chief, is underlain mostly by basic granites or diorites, and limestones only occur as occasional inclusions. The granites bordering the inclusions are altered and partly replaced by epidote, garnet, augite, and other secondary minerals, including bornite, chalcopyrite, and magnetite.

A lens of magnetite, 30 feet in diameter, carrying copper minerals, occurs on the same claim. The lens is situated about 300 feet southeast of the line of limestone inclusions, and is surrounded by epidotized and garnetized diorite. No work has been done on it.

### The Grafter.

The Grafter ranks among the important mines of the district. It is situated about a mile north of the Arctic Chief, at an elevation of 730 feet above Whitehorse. A wagon road, 7.3 miles in length, connects it with the terminus of the railway at the latter point.

The Grafter was staked August 5 1899, by Wm. Woodney, and in the following year a shallow shaft was sunk on a small oxidized area near the eastern boundary of the claim. In 1901, the claim was bonded to a local syndicate, and in that, and the following year, the shaft was continued down to a depth of 50 feet, and a southwesterly drift from the foot of the shaft was carried forward for a distance of 137 feet. Work was resumed in the spring of 1907, by Robert Lowe, the present owner, and a considerable quantity of ore was mined, and shipped during the season.

### Geology.

The Grafter is situated in an area of narrow alternating bands of limestone and basic granite or diorite, all more or less altered. The intrusive here is a light to dark grey, rather coarse rock, mottled everywhere by dark areas, from a few inches to several feet in diameter. Most of these are basic segregations, but the angular character of a few of the larger ones suggests inclusions. Small light coloured aplite veins cut across both light and dark areas, and give the rock a very variegated appearance.

The intrusive is more basic than usual, the sections examined indicating a diorite, and in some instances, where augite is present in considerable quantities, a diorite-gabbro rather than a granite. The segregations consist mostly of hornblende, and a kaolinized plagioclase with some pyroxene, orthoclase, biotite and magnetite. Secondary minerals, mostly andradite, epidote, augite and actinolite, and copper sulphides, have de-



veloped in the granite near the limestone contact, and occasionally almost completely replace it.

The narrow limestone bands near the Grafter are enclosed in granitic rocks, and are altered into coarse, white and greyish marbles. In the immediate vicinity of the ore body, and at other points along the contact, the limestone is strongly mineralized, chiefly with andradite and varieties of pyroxene and hornblende. Besides these, a few nodules of serpentine, probably derived from the ferro-magnesian minerals, are also present. A peculiar, yellow banded variety proved on examination to be impregnated, in layers, with silica and iron.

### Workings

The workings on the Grafter consist of a shaft somewhat less than 100 feet deep, sunk on the ore body. At the 50 foot level, the ore body, which here describes a semi-circular course, has been followed for a distance of 150 feet, and has been stoped out in places nearly to the surface. A southwesterly drift, 137 feet in length, has also been run on the same level, to undercut a second surface showing. No ore was found in the drift, but more cross-cutting is necessary to prove definitely its existence, or non-existence, at this depth.

### Ore Body and Ores.

The Grafter ore body has developed near the end of a small limestone tongue, which penetrated the main granite area for a few hundred feet. The limestone at the extremity of the tongue is irregularly altered, portions of it being completely replaced by the ordinary assemblage of secondary minerals; while other portions, sometimes directly above, are almost free from them. The granites, or diorites bordering the limestone are also more or less completely replaced along a narrow intermittent zone by the same minerals which have developed in the limestones, and in some areas the present representatives of the two rocks are so similar that they cannot be distinguished in the field.

The ore body worked at present has formed around a core of nearly pure, white crystalline limestone, 28 feet across. Development work has not proceeded far enough to show whether the central limestone mass is entirely encircled or not. At the 50 foot level, ore has been followed continuously around one end of the core, for a distance of 150 feet. The ore body here has a maximum width of 17 feet, and with the exception of one lean stretch, at the end of the oblong limestone core, is seldom less than 6 feet in width.

The continuation downward of the ore body, to a depth of 90 feet at least, was proved by a shaft, sunk during the past season; and preparations were being made at the time of my examination to drift along it at that level.

The Grafter ores consist essentially of bornite and chalcopyrite, in varying quantities, disseminated through a hard garnet-augite-tremolite gangue. Malachite and azurite, cuprite and native copper, also occur in small quantities. Magnetite is common, but does not form large masses, and grains of pyrite, a somewhat rare mineral in the ore bodies, are occasionally found intergrown with the chalcopyrite. A small veinlet of quartz, carrying specks of native gold, was cut in sinking the shaft. The gangue minerals, besides those mentioned, include actinolite, canerinite, and epidote.

The copper minerals are usually most abundant close to the unaltered limestone, and the grade of the ores decreases gradually, as a rule, away from it, until they become too lean to ship. Occasional grains and bunches of bornite and chalcopyrite occur throughout the whole altered area.

The shipments from the Grafter to date, mostly made during the past season, have amounted to about 2,000 tons. The ore shipped carried from 6 to 8 per cent. of copper, and contained besides, values in gold and silver, averaging about \$3 per ton. It was practically unsorted.

The smelter returns of a couple of average shipments are as follows:—

| Lbs.         | Moist. | Dry W't. | Copper. | Silver.  | Gold.    |
|--------------|--------|----------|---------|----------|----------|
| 183,460 ...  | 1.5%   | 180,708  | 7.83%   | 1.88 oz. | 0.12 oz. |
| 221,370 .... | 1.3%   | 218,492  | 7.03%   | 1.64 oz. | 0.10 oz. |

### Claims in the Northern part of the District

#### The Pueblo

The Pueblo mine is situated in the valley of Porter Creek, near the northern end of the copper belt, at an elevation above the sea of 2,260 feet, and above Whitehorse of 570 feet. It is connected with the latter point by a good wagon road, 6.5 miles in length.

### History

The Pueblo concession was staked July 7, 1899, by H. E. Porter. The original discovery was made—so it stated—not on the great copper-stained hematite mass which now gives it value, but on an unimportant quartz vein situated near the eastern boundary of the concession. It passed, soon after being staked, into the possession of the Whitehorse Copper Company, and was almost immediately bonded—with fifteen other claims owned by the same Company—to the British-America Corporation. Some development work was done by the latter company; but the grade of the ore not proving satisfactory, the bond was thrown up. Early in 1906, the concession was bought by the Yukon Pueblo Mining Company, of Spokane, Wash., U.S.A., and a systematic exploration of the ore body has since been in progress.

### Development Work

The development work by the British-America Corporation consisted of sinking a shaft 70 feet deep, and drifting across the lode from the bottom of this. These workings were filled with ice and water at the time of my visit, and were inaccessible. The main drift extends about N. 19° W. from the bottom of the shaft, for a distance of 120 feet; and 30 feet from the face a shaft was sunk to a depth of 30 feet below the level of the drift. A second drift extends southwest from the bottom of the 70-foot shaft for a distance of 35 feet.

The long drift, and both shafts, are reported to be entirely in ore, while the short drift penetrates crystalline limestone. Work under the present management has consisted mainly in determining the surface outline of the ore body, and in removing the boulder clay which covers the eastern part of it.

### Geology

The Pueblo ore body is situated near the granite-lime contact; but appears to be enclosed entirely in crystalline limestone. Just how close it approaches the actual contact is not known, as the country east of it is heavily drift-covered. The first outcrop of granite—here a hornblende variety—occurs in an easterly direction, at



a distance of 380 feet, and in a northerly direction, at a distance of 270 feet. The limestone replaced by the ore body was originally cut by granite dykes, and partially altered portions of these are still recognizable. A porphyrite dyke, 2 to 4 feet in width, younger than the ore body, crosses it in a northerly direction. The dyke has been attacked by solutions containing copper, and is everywhere decomposed and copper stained. Portions of it, for a considerable distance below the surface, have been removed, and the space filled in with gravel and boulders.

The limestone in the vicinity of the lode is highly crystalline, and contains a few garnets, but is not rich in secondary minerals. The granites immediately bordering the limestone, descending Porter Creek valley, are also only slightly mineralized. Further down at a distance of 840 feet from the main ore body, an area of intense mineralization occurs. The granites exposed on the right bank of the Porter Creek are filled with secondary minerals, mostly garnets, for a distance of over 300 feet. Some iron, in disseminated grains and small bunches, carbonates of copper, and occasional grains of chalcopyrite, are also present. Limestones occur on the opposite bank of Porter Creek, and probably border the mineralized area, but the contact is concealed beneath the wash-covered flats of Porter Creek.

### Ore Body and Ores.

The Pueblo ore body, as exposed on the surface by present development, is an irregularly shaped mass, 300 feet in length, and 170 feet wide, near the centre. The surface section measures approximately 33,000 square feet. It has been proved to a depth of 100 feet. The horizontal section at this level is not known, as it was only reached by a single shaft. At the 70 foot level the dimensions probably equal those at the surface, as a drift 120 feet in length from the foot-wall failed to reach the hanging-wall. The general dip of the lode has not been definitely proven. The foot-wall near the shaft has a northerly inclination of about 60°.

The ore is essentially a cupriferous hematite, deposited in limestone by a metasomatic replacement of the latter. The replacement has been nearly complete, only occasional traces of the original limestone remaining. The replacement of a granite dyke which cuts the limestone is less perfect. Portions of the dyke have been wholly or partially altered to iron and other minerals, but in places its original character is still evident.

The hematite grades in texture from a fine compact variety to a coarse glistening specularite. It is always slightly oxidized, even at the lowest depth reached, but the oxidation is confined, as a rule, to the surface of the grains, and no complete conversion of the hematite to limonite has been effected, except at a few spots on the surface. An irregular silicification of the lode, by surface waters, has produced important changes in the character of the ore. Certain areas have been converted by this agency into hard siliceous masses.

The copper sulphides associated with the hematites have suffered more by alteration than the hematite itself, and have been largely altered into carbonates, oxides, and silicates. No bornite has so far been found, although this mineral was probably present originally, as it is common throughout the district. Chalcopyrite has also disappeared from the greater portion of the lode, but has been preserved in a few limited areas. The carbonates of copper, especially the green carbonate, are the most important economic minerals in the portion of the lode explored at present. They occur disseminated

throughout the hematite, and while more abundant in some portions than in others, nowhere form large, pure masses. The silicate of copper crysocolite is common, especially in the silicified portions. Cuprite, the red oxide, is sparingly distributed in veinlets, and small masses, through limited portions of the lode.

The alteration of most of the original copper sulphides into various secondary minerals, was accompanied by an impoverishment of certain portions of the lode and an enrichment of others, especially near the periphery. The grade on this account is variable, ranging from 1% up to 10%, or more. The smelter returns from a shipment of 700 tons, taken from different parts of the lode, gave 5 1-2% of copper, and 1 1-4 ounces of silver, while the average grade of the whole lode, so far as explored, probably approximates 4% in copper. The great excess of iron over silica—usually amounting to from 26%, to 30%—is an important feature of the ore.

The gold and silver values in the Pueblo ores are small, as a rule, although occasional assays show from \$1 to \$2 in gold, and from one ounce to three ounces of silver per ton.

No shipments were made from the Pueblo during the past season.

### The Anaconda.

This claim is situated west of Porter Creek, near the northern end of the copper belt. The principal development work consists of a long tunnel, driven westerly from the bottom of Porter Creek valley into the centre of a band of copper stained limestone which crosses the claim. No shipping ore was encountered, and the tunnel is now abandoned. During the past season the claim was under bond to Col. Thomas, of Pittsburgh, and a small amount of development work, principally stripping and trenching, was done.

### Geology.

The Anaconda is situated along the eastern side of the main granite belt, and is underlaid largely by granite of the usual character. Limestone outcrops along the north-eastern portion of the claim, and a spur of limestone from the main mass, 200 to 600 feet in width, crosses the claim in a diagonal direction. South of the limestone spur several small inclusions of lime occur in the granite.

The limestone is coarsely crystalline, and in places is irregularly mineralized, chiefly with garnet, augite, tremolite, and epidote, usually associated with more or less bornite and chalcopyrite, and carbonates derived from them. The principal mineral development takes place, as a rule, some distance away from the granite, and not at the immediate contact.

The limestone dips steeply toward the granite, and the bedding seems to have exerted an important influence on the mineralization. Certain beds are largely replaced by garnet, while others alternating with them have been converted into tremolite, augite, and the copper sulphides, and others again have not been affected, or only slightly. The bands replaced by tremolite are usually rich in copper minerals, and constitute the ores, while the garnet bands are only occasionally productive.

### Ores.

Croppings of copper minerals occur at a dozen or more points on the Anaconda claim, but have only been opened up by shallow pits and trenches, and practically



nothing is known of their behaviour in depth. A promising ore body, situated in the limestone, about 50 feet from the granite contact, was uncovered by trenching at a couple of points during the past season. The following section, measured along one of the trenches, illustrates the irregular manner in which the limestone is mineralized.

The principal ore body has a width of 12 feet, and is overlaid by limestone, and underlaid by a gabbro-porphyrite dyke. It consists mainly of tremolite, with subordinate quantities of augite and garnet, all carrying more or less bornite, chalcopyrite, and copper carbonates. Two small ore bodies, each about 3 feet in width, alternating with garnet and lime, parallel the main deposit, on the south. Other openings to the north and south, along the strike, show that the main lens carries its width for a distance of about 100 feet, and then narrows down. A shaft sunk on the lens to a depth of 30 feet, followed ore to the bottom.

Other lenses in the limestone, of more or less promise, have been trenched across, southwest of the one described, and one also occurs at several points in the bordering granite. The character of the croppings fully warrants further development work.

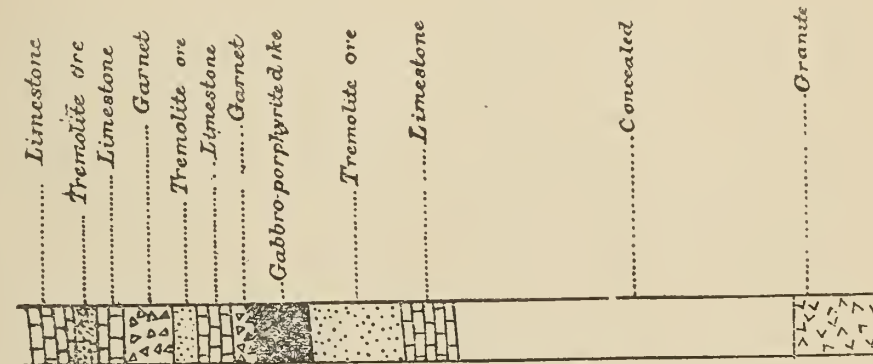
bodies, as usual, have developed. The limestone is crystalline, and at various points along the contact is partially replaced by augite, garnet, chalcopyrite, magnetite, etc. The grano-diorites have also been mineralized, principally with garnet and epidote, for varying distances back from the contact, but otherwise, present no special features.

#### Development.

The workings consist of a shaft, or steep incline, 92 feet in length, affording a depth of 84 feet. From the foot of the shaft exploratory drifts, totalling 270 feet in length, have been run in various directions, partly in ore and partly in more or less altered lime and diorite. Besides the main shaft, two other shafts, each about 20 feet in depth, have been sunk on promising outcrops of ore, and some stripping has been done.

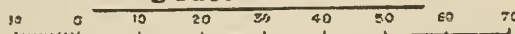
#### Ore Body and Ores.

Copper minerals in some quantity are seldom absent from the exposed portion of the lime-grano-diorite altered contact zone on the Valerie. They are irregularly distributed, rich areas alternating with comparatively lean stretches. The upper part of the present



SECTION SHOWING ALTERNATING BANDS OF ORE, LIMESTONE AND GARNET

Scale in feet



#### Claims in the Southern Part of the District—The Valerie.

This is the only claim in the southern part of the copper belt on which any considerable amount of development work has been done. It is situated west of the head of Miles canyon, and about three miles south of the Arctic Chief. A wagon road, two and one-half miles in length, to Wigan station, on the White Pass railway, was under construction during the season. The Valerie was staked August 22, 1899, by Gustave Gervais. The early development work consisted in sinking shallow shafts on the principal ore outcrops. From these 40 tons of high grade chalcopyrite ore were shipped, in 1904. Development work was resumed, in 1907, by Mr. A. B. Palmer, of Whitehorse, the present owner, and important discoveries of ore have since been made.

#### Geology.

The western portion of the Valerie is underlaid by limestone, and the eastern portion by hornblende granite, passing in places into a diorite, and it is along the ragged contact between these rocks that the ore

working shaft is sunk in an outcrop of chalcopyrite ore, 10 to 15 feet in width. At a depth of 25 feet, the ore ceased, and the shaft was continued through barren rock, mostly altered diorite, down to the present 84 foot level. Short drifts to the north and north-east, from the foot of the shaft, soon entered ore, and further exploratory work outlined a shoot of rich ore, approximately 50 feet in length, with a maximum width of 17 feet. An outcrop of ore on the surface, about 50 feet north-west of the shaft, probably represents the upward extension of this shoot. Three lenses, containing shipping ore, occur on the surface, while only one has so far been found in depth. It is probable that others will be discovered, when the present short drifts are extended farther along the limestone contact.

The ore shoot penetrated in the lower workings of the Valerie, is bordered on the south by a wide zone of altered and unaltered limestone, and altered diorite, impregnated with arsenical pyrites, in grains and bunches, associated with small quantities of chalcopyrite. The values in this belt are small, as the copper percentage is low, and assays show only traces of gold and silver.

The Valerie ores resemble those of the Pueblo, in consisting entirely of chalcopryrite, and derivative minerals. Accompanying these are mispickel, magnetite, augite, garnet, and calspar. No bornite has been found. The chalcopryrite aggregates are larger than usual, and occasionally form solid bunches, several inches across.

The derived minerals, mostly malachite, azurite, cuprite, and native copper, are fairly abundant, down to the lowest depth reached.

No shipments have been made from the Valerie since 1904, when 40 tons of selected ore, obtained from the surface workings, were sent to the smelter. This ore is stated to have averaged 18% copper, and over \$5 in gold per ton.

A considerable quantity of high grade ore was obtained from the exploratory drifts run during the season.

The equipment at the mines consists of a 20 h.p. boiler; an 8 h.p. hoist; and a No. 5 Cameron sinking pump.

## WHAT IS AN ORE?

By J. F. Kemp, D.Sc., Dept of Geology, Columbia University, N.Y.

(Annual Meeting, Canadian Mining Institute, Montreal, March, 1909.)

(Continued from Nov. 15th issue.)

The idea or condition of profit enters here, but it would appear that the authors intended to define an ore according to the condition that the metalliferous deposit should attract the attention of the miner; that is, it should be a deposit out of which at the outset the miner thinks he can make a profit, whether the result justifies his expectation or not. There is a possibility in this of which I will make further mention in conclusion.

We now come to a group of definitions which clearly treat of ore in the technical sense, and which base the meaning upon the possibility of profitable extraction or treatment. In Dr. Murray's New English Dictionary, 1905, the most comprehensive of its kind, we find:—

"Ore.—A native mineral containing a precious or useful metal in such quantity and in such chemical combination as to make its extraction profitable."

This definition is clear-cut and concise. We are reminded, however, that an ore is sometimes an aggregate of several minerals, any one of which perhaps if considered by itself would not be profitable, yet the sum total is. In the low grade copper ores of the Boundary district, the little gold and the little silver which are present are important factors in the total, yet no one of the three metals alone in these percentages could constitute an ore. It would have been well to have added after native mineral the expression "or aggregate of minerals" to allow for such cases.

In the "Universal Encyclopedia and Atlas," published by the Appletons in 1901, the following definition by Professor Thomas Eggleston appears. It is taken from Johnson's Encyclopedia published twenty years earlier and of which the Universal is the continued revision.

"Ore.—A metal chemically combined or in the native state, mechanically mixed with other substances, which render treatment necessary to separate it. In a strictly technical sense, only those substances are ores, which contain the metal in sufficient quantity and of sufficient purity to make the treatment profitable. Arsenopyrite, a combination of arsenic, sulphur and iron, contains 34.4 per cent. of iron, but it is not an ore of iron because the metal made from it is not of sufficient commercial value to pay the expense of treating it."

In the same volume the expression "ore deposits" is defined by R. Pumpelly and Charles Kirchoff along the same lines, but a distinction is drawn between ore and gangue.

In other works of similar scope, like the New International Encyclopedia, recently published by Dodd, Mead & Co., very much the same definition appears. "Ore Deposits, the name applied to deposits or accumulations of metalliferous minerals or ores found in the earth's crust. The term ore includes those portions of the ore body in which the metallic minerals form a sufficiently large proportion to make their extraction profitable; aside from these, there are often quantities of associated non-metallic minerals forming masses containing little or no metal, which are termed the gangue."

Authors of books on mining are inclined to look with favour on the same line of attack. In the "Manual of Mining," by M. C. Ihleng and E. B. Wilson, 4th Ed., New York, 1907, p. 3, after a paragraph treating of the native metals we find:—

"Ores.—With these few exceptions (i.e., the native metals) the metals are found in chemical union with non-metallic substances more or less completely segregated to constitute mineral. Any accumulation of mineral of good quality and in sufficient concentration to warrant the expenditure of energy for its extraction is an ore. Manifestly this is a fickle term since it depends for its stability upon the casual conditions of the market as well as upon the mineralogical features." In a glossary at the close of the work there appears: "Ore.—A mineral of sufficient value (as to quality and quantity) which may be mined at a profit."

The short definition from the glossary is a little infelicitous in form, and a little sweeping in statement. It would, of course, include coal, asphalt, ozocerite, and other non-metallics, which the greater number of us would certainly hesitate to call "ores."

The longer statement introduces the term "mineral," which deserves a word of comment. Aside from its general meaning under which are included substances of inorganic origin as against organic, the word mineral is used, in the United States at least, to designate in the large way the objects of mining, without special reference to profit or loss. Thus the law affecting the Public Lands recognizes "mineral claims," but either from a disinclination on the part of its framers to enter into the



question of profit or loss, or else from a desire to embrace also possible non-metallic deposits, mineral is consistently used instead of ore. Thus C. H. Shamel states in his valuable treatise on "Mining, Mineralogical and Geological Law," New York, 1907, pp. 55-56:—

"We may summarize the American law as to the legal definition and meaning of the word 'mineral,' when used in deeds, leases or other legal instruments, as including in the absence of special provisions in such instruments, all metallic minerals of sufficient value to justify mining and extracting the same, whether for the purpose of reducing the metal therefrom or some other industrial use. It also includes rock used for building materials, etc., coal, petroleum and natural gas. Kaolin, brick-clay, slate, etc., have not been passed upon by the American courts; but on the authority of the English cases, and the decisions of the land departments hereinafter mentioned, the probabilities preponderate that the courts will hold them to be included under the term 'mineral,' the same as granite, marble, etc."

In the paragraphs immediately following in the work cited, Dr. Shamel reviews the meaning of "ore" in the few cases in which it has been defined by the courts. The definitions are in the purely scientific rather than in the technical sense. The courts apparently prefer "mineral" to "ore," wherever possible.

A definition very similar to the one from the glossary of Ihlseug and Wilson, is to be found on p. 598 of the "Coal and Metal Miners' Pocketbook," which is published by the International Correspondence Schools of Scranton:—

"Ore.—A mineral of sufficient value (as to quantity and quality) to be mined at a profit."

As remarked above, this definition of course includes all manner of non-metallic minerals.

Several definitions from works on ore deposits will perhaps not be without interest. Thus in "A Treatise on Ore Deposits" by J. Arthur Phillips, 2d Ed., revised by Henry Louis, 1806, p. 1, we find:—

"Metals which occur in a state of approximate purity are said to be native, and when two or more such metals are found in combination the substance is called a native alloy. Usually the metals sought after by the miner are, however, not found in the native state, but are mineralized by being united with various non-metallic bodies. In this way they combine with sulphur or chlorine, giving rise, respectively, to metallic sulphides or chlorides; with oxygen the metals form oxides, and with acids they yield salts, such as carbonates, sulphates, and phosphates."

"All natural combinations of a metal with such mineralizing substances are called ores when the proportion of metal which they contain, after suitable mechanical preparation, is sufficiently large to admit of their being advantageously treated by the metallurgist. Although perhaps not strictly correct, any material obtained by mining that contains a workable proportion of a metal is often called an ore, even if the whole of the metal be present in the native state."

"This definition perhaps unconsciously so far as its writer was concerned, contrasts the point of view of the metallurgist with that of the miner. But it is a contrast of which we shall need to take cognizance. Thus a miner might extract a quantity of metalliferous minerals from the ground at a loss. He might sell them to a metallurgist at such a price that the latter could profitably treat them. They might thus not be ore for the miner, although ore for the metallurgist. If you saw a pile of magnetite at a blast furnace being successfully treated

you would call it ore, even though it had been bought at the bankrupt sale of some miner."

In W. H. Weed's translation of Richard Beck's *Lehre von den Erzlagern*, under the title, "The Nature of Ore Deposits," New York, 1895, p. 1, we find the following:—

"In a mineralogical sense an ore is a metalliferous mineral or a mixture of such minerals. Practically, however, this definition of an ore must be qualified by the statement that only those minerals and mixtures of minerals are ores from which metals or metallic compounds may be produced on a commercial scale and at a profit."

Two examples of equal mineralogical or petrographic value may differ materially; a basalt carrying enough magnetite to influence the magnetic needle, but yet containing less than 10 per cent. of iron, is far from being an iron ore. On the contrary, a vein with a silver content of only 0.5 per cent. is an ore deposit since with this content it is commercially valuable. In the case of a gold deposit the amount sufficient to distinguish a gold ore from barren rock may be even less, for in California and Dakota gold ores with only 4 to 6 grains per ton of gold are exploited. Hence it is the economic point of view that must always be borne in mind, the profit of working being subject to variation in the course of time. While nickel and cobalt were formerly nicknames for materials which were thrown upon mine dumps as useless, and were considered as a mere nuisance in silver mining, to-day, the compounds of these metals and the associated minerals are in great demand as ores.

To a certain degree a mineralized material may be an ore in one locality and yet not be an ore in another place, the cost of reduction depending on the proximity to lines of traffic and cheap freights.

The science of ore deposits is, in other words, the study and consideration of the deposition, distribution, and origin of rock bodies containing ores in such quantities that they may be extracted profitably by mining operations."

Heinrich Ries, in his "Economic Geology of the United States," New York, 1905, p. 223, gives the following:—

"Definition.—The term, ore deposits, is applied to concentrations of economically valuable metalliferous minerals found in the earth's crust, while under the term, ore, are included those portions of the ore body of which the metallic minerals form a sufficiently large proportion to make their extraction profitable. A metalliferous mineral or rock might therefore not be an ore at the present day, but become so at a later date, because improved methods of treatment or other conditions rendered the extraction of its metallic contents profitable."

R. H. Stretch, in his handbook on "Prospecting, Locating and Valuing Mines, 4th Ed.," New York, 1903, p. 206, writes in this way:—

"An 'ore,' strictly speaking, is a single mineral which is a chemical compound of a useful metal and some other element or acid. In common usage, however, complex mixtures of pure minerals are considered as single ores; while free gold, native silver and native copper, together with their accompanying gangue minerals, are also classed as ore. Among miners, whatever will pay to treat or ship and sell is considered ore, as also low-grade mineral which might be utilized by concentration or improved facilities; but there is an indefinite shading off into material containing traces of ore minerals, but hopelessly unavailable, and this is not considered ore; neither are gold gravel or platinum sands called ore. To avoid



misunderstanding it is best to distinguish between the 'ore' (meaning thereby the whole bulk of the available product) and the 'ore mineral' (usually very much smaller in quantity in all ores except those of iron, manganese, and some lead and zinc ores)."

Probably with search a few other definitions might be found, but without adding anything essentially new or important. I think that we must conclude that a distinction should be drawn between the purely scientific use of the word and the technical. Not every metalliferous mineral is an ore even in the former sense. Many can be cited which it would be ridiculous to call by this name. Nor can a metalliferous mineral be called an ore unless at some time it has proved to be a practicable source of some metal. Once successfully used, it establishes its standing and joins the group of the ores. This differs from Professor Dana's definition that in an ore a metal should be a prominent constituent, since a species of amphibole might have 5 or 10 per cent. of iron, iron being thus a prominent constituent, and yet not be an ore. I suggest the following:—

"In the scientific sense an ore is a metalliferous mineral belonging to the group of those which have profitably yielded the metals to the miner or metallurgist."

"In its technical sense an ore is a metalliferous mineral or an aggregate of metalliferous minerals, more or less mixed with gangue, and capable of being, from the standpoint of the miner, won at a profit; or from the standpoint of the metallurgist, treated at a profit."

The test of yielding the metal or metals at a profit seems to me in the last analysis to be the only feasible one to employ. In a new enterprise, as we all know, it is customary to refer to the mineral in the ground as ore, before it is proved to be such by profitable operation. If the enterprise should subsequently prove unsuccessful, it would only remain for those engaged in it to say that they thought they had ore, but that they had made a mistake. As soon as a shifting or variable standard is introduced, such as individual beliefs or expectations, such uncertain, changeable and on the whole unsatisfactory conditions are developed that a sharp definition upon a secure and unmistakable basis becomes an impossibility. On the other hand, the test of profit certainly meets the requirement that "Use is the law of language."

## AN ENGLISH OPINION OF MINING IN NORTHERN B.C. AND THE YUKON.

At the recent general meeting of the White Pass and Yukon Railway Company, Ltd., held in London, Mr. S. H. Graves, referring to the mining possibilities of the regions served by the W. P. & Y. Railway, expressed himself as follows:

The year has opened up new sources of encouragement for the future in several directions. In the Klondike district the Guggenheim plant has been in successful operation throughout the season, and I understand that the results have more than come up to expectations, and are likely to lead to further installations on a large scale. The same is true of the working of the dredges in the Stewart and Forty Mile districts. But perhaps of even greater promise for the future is the work which has been done in the way of quartz development in the Klondike district, which, as you know, has so far been dependent upon its gold bearing gravels. For several years work of a more or less desultory nature has been done on various gold ore veins and prospects in the Klondike district without

any very definite results, but a year ago work on a serious basis was commenced on what is known as the Dome lode where the surface croppings were considered sufficiently encouraging to warrant exploration at greater depths. With this in view a tunnel was started to crosscut the surface veins at several hundred feet in depth, and this tunnel has been driven into the side of the mountain a distance of about 1,200 feet during the past season, and has already encountered some of the veins. But in order to prove the surface croppings it will be necessary to drive the tunnel probably about 500 feet further. The work so far as it has gone seems to indicate the continuity of the surface formation, and gives good hope of developing a gold mine of first-class importance. On another Klondike quartz property the Lode Star mine in Victoria Gulch, they have already commenced taking out ore, and the first crushing, I understand, averaged about \$17 per ton. You will therefore see that there is ground for hope that the Klondike will repeat the history of other important placer camps and develop from a placer into a quartz mining district. In the Atlin district most of the hydraulic plants were worked last summer with satisfactory results and increased outputs. The Guggenheim plant on Pine Creek was under reconstruction, but I understand that everything will be finished in time for it to be in active operation next season.

In the Windy Arm silver and lead ore district a new company has been organized for the purpose of working the "Venus Extension," and I am informed that the intention is to instal a plant on the property with a view to active operation. But the most important work of the season in this district has been in connection with the development of the "Big Thing" mine, situated about seven miles south of Caribou Crossing on our railway, with which place the Yukon Government is connecting it by a road. The owners of this property are men of means, and as the result of last summer's work it is now proposed to instal an air compressor and ship ore on a moderate scale during this coming winter, with a view subsequently to connecting the mine with our railway by tramway, and shipping on a large scale should these preliminary shipments prove satisfactory. For several seasons a good deal of attention has been attracted to the Wheaton district, situated about 20 miles west of Robinson, a station on our line, with which place it is connected by a good road. Considerable development work was done last summer on some of the properties in this district, and the results are most encouraging for its future. Many competent judges think that it is destined to become a quartz mining camp of great importance, and there can no longer be any doubt as to the existence of large bodies of highly mineralized ore. In the White Horse copper district operations are still restricted by the difficulty of procuring capital consequent upon the low price of copper. But the work done has demonstrated that some of the mines could ship steadily at a profit even at the present low price of copper, and negotiations are pending in connection with several of the properties which, if carried through, are likely to result in steady ore shipments in the near future. From what I have said you will realize that during the past year in no less than four widely separated and important mining districts on our line substantial progress has been made towards the development of permanent quartz mining and its attendant industries, while at the same time the output from the workings of the gold-bearing gravels of the Yukon by modern machine methods continues to increase.



## COAL MINE ACCIDENTS AND THEIR PREVENTION.

Address Delivered Before the National Civic Federation  
in New York, November 23.

By J. A. Holmes, expert in charge Technologic Branch,  
United States Geological Survey.

Our coal industry in its phenomenal growth has nearly doubled during each succeeding decade of the past 60 years. It has had to do more than keep pace with our increasing population, for, while it supplied less than one ton per capita to the American people in 1880, it has had to supply nearly six tons per capita during 1908. Its growth has been too rapid for systematic development; and the industry to-day represents a great host of scattered, warring, discouraged elements, without organization or co-operation.

In this industry are now employed some 600,000 miners, who work at some 6,000 different mines, and produce yearly about 500,000,000 tons of coal.

Not only is the nation increasingly dependent upon this coal for its heat, light and power for its manufacturing industries and transportation facilities, but this coal and other mineral products now contribute in tonnage more than 65 per cent. of the total freight traffic of the country.

The economic conditions upon which coal mining is based in this country are fundamentally bad; and the evil consequences are so far-reaching as to both time and extent, and are so essentially national in character, that this subject demands the earnest consideration of our best statesmen, as well as of our best engineers.

(1) In spite of this rapid growth in our demand for coal the normal productive capacity of our coal mines under continuous operation greatly exceeds this demand;

(2) Ruinous competition exists not only between the operators in the same field, but between the operators of one field as against those in another field, or in another State, where different mining laws and regulations exist;

(3) This competition is first of all driving out of the business the small operators except where they find protection under local freight rates; and is forcing even the larger operator to mine coal under conditions which he cannot approve but from which he finds no escape. If he and his fellow-operators endeavor to "get together" and place the price of coal at the mine on a reasonable basis they go to jail under either a Federal or a State statute; and as the only alternative each must live (or succumb) by underbidding the other, which he can do only through wasteful and unsafe mining methods;

(4) Even when the demand for coal and the prices are at their best, under existing conditions, the operator can mine only that part of his coal which can be taken out most cheaply and sold at higher prices; and the remainder must be left underground in such shape as may preclude its future recovery. And thus we waste yearly more than 250,000,000 tons of the nation's fuel supply;

(5) The American mine owner is as humane as is the mine owner of any other country; and he would like to follow every practice and use every appliance for safety to be found in Britain, or France, or Belgium, or Germany, or elsewhere; but he pays his miners higher

wages, and at the same time receives for his coal at the mine less than half the price received for similarly mined coal by the operator in these countries; and he must employ miners an increasingly large percentage of whom come to him unfamiliar either with the practices of the industry or with the language or traditions of the country;

(6) And the penalty which the nation is paying for this bad system is this increasing waste of resources and the still more unpardonable increasing waste of human life—the yearly loss of 250,000,000 tons of coal, and the killing or injuring yearly of from 8,000 to 10,000 men.

And what are the remedies for this bad situation?

(a) Investigations, such as are now being conducted by the government, as to the causes of mine explosions; and other similar investigations as to the causes of mine accidents of other kinds, and as to methods of prevention;

(b) Educational work among the miners and the lower active mine officials as to these causes and remedies;

(c) The training of men at each mine as to the best methods of using explosives, using electricity, handling of gases and dust, of timbering, of preventing and extinguishing mine fires; as to the methods of rescue work, and as to the methods of first-aid-to-the-injured work;

(d) The development of better and more uniform mining laws, rules and regulations, based upon accurate data and experience;

(e) Active, determined co-operation between the miners and the mine management and the State's inspectors in the enforcement of these rules and regulations with a view to the maintenance of the safest possible conditions in every mine.

The above are all parts of the program for lessening and alleviating mine accidents; but they do not complete the program. It is an essential part of this program that:

(f) The ruinous competitive system upon which coal mining in the United States is based at the present time should be changed, and that the price paid for coal at the mine should be such as will permit and secure safe and efficient mining—mining unaccompanied by either this large loss of life or waste of resources—mining which can have due regard to not only the safety but also to the health and the comfort of the men who toil underground and whose labour is so essential to the welfare of the nation. All this can be done without adding appreciably to the burden of the average American citizen; without any increase in the price of coal at the poor man's cottage, and without the risk of any unreasonable restraint of trade.

There can be no permanent industry without reasonable profits. It is unjust and irrational that in this great and essential branch of industry, reasonable profits should be dependent upon any unnecessary sacrifice of human life, and unnecessary waste of resources which we can neither replace nor restore and which will be essential to the future development of the country.

This industry needs and deserves fair treatment at the hands of the American people, and upon its receipt of such treatment depends in no small degree not only the welfare of the operators—though nobody cares about them—but also the welfare of the 600,000 miners who risk their lives in supplying the fuel for the nation's comfort and convenience.



## BOOK REVIEWS.

**The Metallurgy of the Common Metals—Gold, Silver, Iron, Copper, Lead and Zinc.** By Leonard S. Austin. Second edition, revised and enlarged. 500 pages. 195 Illustrations. \$4 post paid. Mining and Scientific Press, 667 Howard Street, San Francisco.—1909.

Only by contrast and careful revision can a scientific text-book be kept approximately abreast of the times. Only the books that have filled satisfactorily their niche in the worker's library see more than one edition. In other words, except in the case of books prescribed for use in schools and colleges, the number and size of successive editions may be considered as quantitative measures of merit.

"The Metallurgy of the Common Metals" was published in May, 1907. Its second edition, revised and enlarged, is now being distributed.

The volume, in its first edition, outlined processes for winning the common metals from their ores and then refining them. In its second edition, the subject of thermo-chemistry is given fuller treatment, the description of the cyanide process has been amplified, improvements in milling methods noted, and the commercial aspects of various metallurgical methods more adequately dealt with.

Professor Austin's book is a general guide to the study of metallurgy. It covers a wide range of subjects; but it also elucidates plainly broad principles and general practice. To the student it is of particular difficult study. The operating metallurgist will find value, as it presents a bird's-eye view of a complex and much that is suggestive in its pages.

"The Metallurgy of the Common Metals" is the only up-to-date handbook covering the field indicated by its title. Its author has kept in view the practical phases of his subject. While one or two chapters, notably that on "Iron," are a trifle too sketchy, yet, on the whole, the author has exercised excellent judgment in choosing, condensing, and presenting his material.

**The Cost of Mining—An Exhibit of the results of Important Mines throughout the World.** By James Ralph Finlay. 415 pages. Illustrated. \$5 post paid. McGraw-Hill Book Company, 239 West 39th St., New York.—1909.

"The Cost of Mining" is the outgrowth of discussions and correspondence that appeared during the past six years in a contemporary mining periodical. "While all of the material in this book is either old or public property to the extent of being known to at least a portion of the profession, there is nevertheless something new in it in that it presents a view of the economics of mining on a grand scale and in broad outline." This quotation from the preface sums the aim of the author.

Mr H. C. Hoover's recent work on the "Principles of Mining" has proved most acceptable as a resume of the processes of valuation, organization, and administration used in mining enterprises. Mr. Finlay's "Cost of Mining" makes an excellent companion to Hoover's "Principles."

**Contents.**—Mr. Finlay has drawn freely upon mines in all parts of the world for data and examples. His twenty years of experience has been unusually varied.

After general consideration of valuation, costs, etc, certain specific branches of mining are analyzed. These branches are the mining and production of coal, iron, copper, lead, silver-lead, zinc, gold and silver. The table of contents is as follows:—

- Chapter I.—Value of Mining Property.
- " II.—Factors Governing Variations.
- " III.—Partial and Complete Costs.
- " IV.—Statistics of Coal Production.
- " V.—Cost of Mining Coal.
- " VI.—Cost of Mining Lake Superior Iron.
- Chapters VII. to XII. deal with various Copper Districts.
- Chapter XIII.—The Copper Mining Business in General.
- " XIV.—Lead.
- " XV.—Silver-Lead Mining.
- " XVI.—The Cost of Silver-Lead Mining.
- " XVII.—Zinc Mining.
- " XVIII.—Occurrence and Production of Gold.
- " XIX.—Quartz-Pyrite Gold Mines.
- " XX.—Cripple Creek, Kalgoorlie and Goldfield.
- " XXI.—Silver Mining at Cobalt and Guanajuato.

**General.**—In his introductory chapter, "Value of Mining Property," Mr. Finlay first emphasizes the vastness of the "real mining business—the great bulk of which the precious metals constitute only small percentages." He then proceeds to demonstrate the fundamental importance of considering all the factors that affect investment. For instance, the price of any product must be carefully averaged over periods of years before probable future fluctuations can be safely approximated. Low prices need not mean corresponding loss. Various factors in mining, such as the shipment of selected rich ore to smelters when low prices prevail, help to maintain profits.

In tracing the general relation of cost to price, Mr. Finlay illustrates his points aptly. For example, copper is produced for 10 cents a pound. When copper stands at 15 cents a pound the normal profit is 5 cents. Suppose that copper goes up to 20 cents a pound. Generally this rise is due to a shortage of ore or to a shortage of labour, or to both. Immediately each mine, under the stimulation of a higher price, undertakes the working of a proportion of ore of lower grade than would be payable with copper at 15 cents. Consequently costs are very much increased, and profits are relatively lessened. Developing the theme further, Mr. Finlay shows that in these circumstances costs may be so augmented as to absorb the whole advantage of the increased price.

Diminished cost per ton, due to larger scale of operations, hardly ever results in an increased profit per ton. This and similar propositions are dwelt upon. The nature of mining investments is stated, and the determination of present value from known factors is set forth. Here we shall quote an axiom, tersely stated by Mr. Finlay: "The general principle at the root of the matter is that the annual dividends must yield a good annual interest on the sum invested, and also permit a certain sum to be set aside each year, which



securely invested at compound interest will repay the investment when dividends cease on the exhaustion of the mine."

Chapter II. commences with a definition of the cost of mining, which runs in part as follows:—“(a) The use of capital in acquiring the opportunity to mine, i.e., ownership of ground, or leases. (b) The use of capital for equipping and developing a mine, for providing mills and smelters. (c) Current operating costs, including taxes, the maintenance of company organization, insurance, litigation, etc.” For purposes of discussion, Mr. Finlay confines himself to “The complete cost of developing, equipping, and working out a mine, allowing interest on the capital required for these purposes until it is returned in dividends.” Dividing factors governing variations into two groups, external and internal, Mr. Finlay proceeds to set forth the elements of a complete cost statement.

“Partial and Complete Costs” is the caption of Chapter III. Costs chargeable to operating, maintenance, depreciation, and amortization, dividend and selling costs, depreciation, amortization are dealt with. The concluding section is written for the investor, and is cogent and pointed.

Various classes of coal mines, iron mines, and copper mines are then discussed. Actual cost statements are adduced. Particularly interesting are the conclusions reached in Chapter XIII.: “(1) No copper can be produced in North America under present economic conditions at a profit for less than 10 cents a pound. (2) At 11 cents a pound only half the present output can be produced. (3) At 12 cents many of the largest producers would only be getting a new dollar for an old one. (4) At 15 cents the business as a whole is prosperous and profitable only to an entirely legitimate degree. (5) As long as the demand increases as it has increased steadily for the past quarter century, it is safe to count for the next ten years on an average price of 15½ cents, which has been the approximate average for the last ten years.”

The last chapter is a comparison of silver mining at Cobalt and Guanajuato. Cobalt is taken as an example of high mining costs. The Kerr Lake Mining Company's statement for the year ending August 31st, 1908 shows that the ore mined, 528 tons, cost about \$579 per ton, including all plant and machinery investment charges. The silver content per ton was 2,790 ounces. The total cost of mining worked out at less than 21 cents per ton. The present cost of silver per ounce at the Guanajuato mines is roughly 50 cents. The operating expenses per ton of ore are about \$521. The average ore is worth \$7 or \$8 per ton.

\* \* \* \* \*

“The Cost of Mining” is undoubtedly a thoughtful exposition of a subject to which far too little thought is given in this country. It abounds in suggestions and statements that will make the investor sit up.

The statement that low costs in mining may mean greater expense elsewhere, that low wages do not mean low costs, and so on, will, no doubt, sound paradoxical to many. Mr. Finlay establishes their accuracy.

In general treatment and in diction, “The Cost of Mining” leaves little to be desired. The arrangement might have been improved. Incidentally, there are several printer's errors that distress the eye. But, on its merits, Mr. Finlay's new volume is entirely worth while.

## THE KOPPERS BY-PRODUCT COKE OVEN AT SAULT STE. MARIE.

After thoroughly investigating the different systems of by-product coke ovens, the Lake Superior Corporation placed a contract for the erection of a by-product plant at Sault Ste. Marie, Ont., Canada, with H. Koppers of Joliet, Ill., whose ovens and by-product plant are used by the Illinois Steel Co., at Joliet, and also adopted by the Steel Corporation at their plant at Gary, Ind.

The plant at Sault Ste. Marie will consist of 110 ovens, arranged in two batteries, each of 55 ovens. The type of ovens will be the same as is being erected at Gary, Ind., the size of each being 37 ft. between doors, 17 inches at pusher end, 21 inches at quenching end and 9 ft. 10 3-8 inches at top of arch. The cost of the plant will be about one and a half million dollars.

The charge of coal for each oven will be about 13 tons, making a total charge for the 110 ovens, of over 1400 tons of coal.

The yield of coke per oven will be about 10 3-4 tons, or nearly 1200 tons per day. For the generation of industrial power, nearly 10,000,000 cubic feet of surplus gas will be available. Indicated by heat units, the quality of this gas is 500 B.T.U. per cubic foot, and represents a heat value of about 200 tons of good coking coal.

Koppers improved method of recovering the by-products will be adopted at this plant. The distinguishing feature of this system, is the extraction of ammonia direct from the gas, in the form of sulphate of ammonia, without the employment of the water scrubbing process.

An improvement in the coke quenching arrangement will also be instituted, so that instead of having a coke bench, the coke will be pushed into a coke quenching car.

It is expected that the plant will be in operation by January 1911.

## CANADIAN PATENTS.

The following is a list of Canadian patents issued on November 23rd, 1909, relating to mining and metallurgy and furnished by Fetherstonhaugh & Co., 5 Elgin Street, Ottawa, Canada. Russel S. Smart, resident, from whom all information may be obtained:—

122012.—V. Raisin, Paris, France, apparatus for the separation of acetic and formic acids assigned.

122016.—T. C. Johnson, New Haven, Conn., fire arms, Winchester Repeating Arms Co.

122057.—D. Belloni, Edri, Pa., systems of mine ventilation.

122112.—J. S. McIlgenny, Washington, D.C., methods of treating gas.

The following is a list of Canadian patents issued on November 16th, 1909, relating to mining and metallurgy, and furnished by Fetherstonhaugh & Co., 5 Elgin Street, Ottawa, Canada, Russel S. Smart, resident, from whom all information may be obtained:—

121968.—J. C. Clark, Atlanta, Ga., pulverizing mills.

121906.—W. H. Paul, Birkenhead, Eng., treating grain for milling.

121982.—H. W. Doughty, Amherst, Mass., methods of treating wood during distillation. H. W. Doughty and F. E. Waters.



### PERSONAL AND GENERAL.

Mr. G. Brewer Griffin has recently been appointed manager and actively is directing the sales policy of the Detail & Supply Sales Department of the Westinghouse Electric & Mfg. Co., in which department transformers, meters, fans, heating appliances, switches, switch-boards, railway line material, etc., are sold. Mr. Griffin has been assistant manager of this sales department for six years past, having previously been connected with the sale of detail apparatus in the Boston office, altogether having been employed some 7 years with this company. Previous to his connection with the Westinghouse Company, Mr. Griffin was with the Manhattan General Construction Company of New York as a special representative, finally opening an office for them in Boston.

Mr. Samuel A. Chase, who for the past few years has been with the Westinghouse Electric & Mfg. Company in their New York Sales Office as a special detail and supply salesman, has recently resigned to accept a position with the White Investing Company, of New York City, a financial investment company handling stock of many different organizations. Previous to Mr. Chase's employment with the Westinghouse Electric & Mfg. Company, he was a salesman for the Western Electric Company, where he was highly successful.

Mr. S. L. Nicholson has recently been appointed general sales manager of the Westinghouse Electric & Mfg. Company, and has direct charge over the sales policies of the entire company. Mr. Nicholson has been with the company for 11 years in many different capacities, as salesman, as district department manager, and as industrial and power sales manager for the past five years, from which last position he resigned to take the present post. Before coming to the Westinghouse Company he was with the C. & C. Electric Company. He is perhaps best known to motor manufacturers as the organizer and President of the American Association of Motor Manufacturers, an organization which has done much in the two short years of its life to improve the art of manufacturing motors.

Mr. Charles Robbins who has for many years been connected with the Westinghouse Electric & Mfg. Co. in the industrial and power sales department, in connection with the sale of industrial motors, has recently been appointed manager of this department. Mr. Robbins has been with the company since 1899, in which time he has been in the manufacturing department, the New York district office sales department and for the past three years in the industrial and power sales department at East Pittsburg. His headquarters will continue to be at East Pittsburg.

Mr. A. D. Miles, mining engineer, Sudbury, Ont., was in Toronto on December 7th.

Mr. R. B. Lamb returned to New York on December 8th.

Mr. J. D. Ramsay has accepted an appointment as manager of Rand Klipfontein Mining Company in the East Rand.

Mr. C. B. Willmott, Sault Ste Marie, has returned from British Columbia where he was engaged in examining mining prospects for United States clients.

The Soledad Mining and Milling Co. of Mexico has installed complete mills for amalgamation and cyanidation, the machinery consisting of four Nissen stamps, 1,500 lbs. each, machinery complete for regrinding, steam power plant, electrical equipment, the complete order being placed with Fairbanks-Morse & Co.

The Canadian Fairbanks Co., Limited, beg to announce that they have been appointed the exclusive sales agents for Canada for Dicks' Balata Belting and have purchased the business of J. S. Young. All orders in the future should be sent direct to their nearest branch house. Large stocks are carried at the present time at Montreal and Vancouver, and stocks are on the way to the branches at St. John, N.B., Toronto and Winnipeg.

All mineral collections for the Leonard Prize should be forwarded to the Provincial Assayer at Belleville not later than Dec. 31, 1909.

### AN INSTRUMENT FOR DETERMINING VERTICAL DEPTHS IN DIAMOND DRILL HOLES.

In the construction of the new aqueduct of the city of New York, which crosses the Hudson River just north of West Point, it became necessary to determine accurately the vertical depths of the narrow diamond drill bore holes which are being sunk under the Hudson River at various angles and which have already reached depths of 1,500 feet.

This problem has been solved by Professors G. N. Lewis and H. T. Kalmus, of the Massachusetts Institute of Technology, who have devised a self-recording pressure gauge which has a diameter of less than  $\frac{7}{8}$  in. and can therefore be placed directly in the terminal section of the drill rod. Since the bore holes are constantly filled with water, the maximum hydrostatic pressure recorded is a direct measure of the vertical depth. It seems probable that this instrument may be of service in other engineering and mining work where it is desirable to determine the vertical depth of bore holes used in prospecting.

The pressure gauge proper consists of a very thin strip of tempered steel bent into the form of a hollow rectangular tube approximately  $\frac{3}{4}$  in. wide, 1-32 in. thick, and 18 in. long. The edges and the lower end of the tube are welded together with the oxyacetylene flame. Into the upper end is welded a small steel tube which in turn is sealed to a straight glass tube, the upper end of which enters an air-tight chamber. The gauge and connecting glass tube are filled with mercury and when subjected to an external pressure the thin steel walls of the gauge undergo considerable temporary deformation, thus diminishing the total volume of the gauge and forcing the mercury from the upper end of the glass tube into the surrounding chamber. When the pressure is released the gauge resumes its original volume and the mercury level in the glass tube falls through a distance which measures directly the pressure to which the apparatus has been subjected. The mercury may now be returned to the glass tube from the surrounding chamber by a simple device.

The instrument gives remarkably reproducible results and is able to record vertical depths up to 1,500 feet with an error of no more than 2 or 3 feet. On account of the extremely small volume of the thin steel gauge, the effect of temperature changes, even amounting to 30 or 40 degrees, is entirely negligible.

### EUROPEAN PETROLEUM.

The production of petroleum by European companies for the week ended October 31st was 1,931 tons.



## SPECIAL CORRESPONDENCE

## NOVA SCOTIA.

**Glace Bay.—The U.M.W.A. Strike.**—In November the mines of the Dominion Coal Company produced 221,000 tons of coal. The figures for the strike period, brought down to date, are as follows:—

|                 | Total Output. | Average<br>Daily Output. |
|-----------------|---------------|--------------------------|
| July .....      | 136,000       | 4,200                    |
| August .....    | 154,000       | 5,900                    |
| September ..... | 180,000       | 7,200                    |
| October .....   | 205,000       | 8,200                    |
| November .....  | 221,000       | 9,100                    |

The outputs of the individual collieries compare with November of last year, as under:—

|             | 1908.   | 1909.             |
|-------------|---------|-------------------|
| No. 1 ..... | 38,226  | 49,034            |
| " 2 .....   | 54,309  | 49,970            |
| " 3 .....   | 18,323  | 20,369            |
| " 4 .....   | 31,171  | 26,196            |
| " 5 .....   | 26,385  | 30,675            |
| " 6 .....   | 12,224  | .....             |
| " 7 .....   | 13,507  | 592               |
| " 8 .....   | 12,366  | 10,660            |
| " 9 .....   | 24,444  | 15,597            |
| " 10 .....  | 13,359  | 12,594            |
| " 12 .....  | 2,025   | 3,651             |
| " 14 .....  | .....   | 1,836             |
|             | 246,339 | 221,200 (approx.) |

On looking these figures over it will be seen that a number of the collieries show an increase over last year's tonnage, and at others the figures closely approximate. No. 6 Colliery is still idle.

**Report of the Deputy Minister of Labour.**—Considering the extremely complicated issues which have brought about the U.M.W.A. strikes in Nova Scotia, the Deputy Minister of Labour has presented to Parliament a report which mirrors the conditions attending the labour disputes at the Nova Scotian collieries very clearly, and Mr. Acland is to be congratulated on having compiled so lucid an account from the conflicting statements which he no doubt met with. At Glace Bay he finds that the strike is "practically broken" and that "the majority of those on strike will be surplus labour during most of the winter." Mr. Acland makes one pertinent annotation—the report says "in twenty-six years Secretary Moffatt says there has been no Provincial Workmen's Association strike calling for financial assistance. These figures justify the claim that the organization has not encouraged strikes, while they are also used to support the contention that the organization (that is, the P.W.A.) was ineffective." "Here," remarks Mr. Acland, "the real test would lie in the relative value of the conditions of work secured in Canada without formal strikes, and in the United States where a more aggressive policy is pursued." When Mr. Lewis, the present President of the U.M.W.A., was in Glace Bay last spring he told an audience of miners that he had found the condition of the miners and their work to be better in Nova Scotia than in the United States. Mr. John Mitchell, late leader of the same body, has just delivered himself of a pronouncement on coal mining conditions in the United States which, if it be only half true, points to a great need for reform in the coal industry in the United States. Mr. Mitchell says "coal mining is the most hazardous industry in America." He points out that since 1839 coal mine disasters in the United States have resulted in the death of 23,000 persons and serious injury of 50,000, and he re-

fers to the extraordinarily high proportionate death rate in the coal mines of the States compared with that in other countries. Mr. Mitchell says: "This proportionate death rate from accidents is attributable to two things—the inadequacy of the laws and the laxity of their enforcement, and to the fact that unskilled emigrant labour is employed in the mines." Reference is also made to a bill which was introduced into Congress to encourage the introduction of life-saving devices in coal mines, but which failed to pass. Such devices have been installed in Cape Breton mines on the sole initiative of the coal owners without assistance or recognition from the Government. In Nova Scotia we make the reasonable boast that our mining laws are adequate and that they are properly enforced; further, even in the face of the large influx of foreign labour that has come to Canada in recent years, the great majority of the Nova Scotian miners are skilled men speaking the English tongue. The fatal accident rate in Nova Scotia coal mines is from two to three per thousand. In 1908 in the United States the figure will not be very far from five per thousand. It is not correct to say that coal mining is the most hazardous industry in America, if America is taken to mean the North American continent. This statement may be true of the United States, and we believe it is, but it is not true of Canada. It is significant that those coal mining Provinces of Canada which have the highest death rate are just those Provinces which have allowed themselves to come under the guidance of the United States labour unions. If the test suggested by the Deputy Minister's report could be applied to the condition of affairs existing in Nova Scotia to-day, the strike would end because the U.M.W.A. would be compelled to return home—there they will find work sufficient to absorb all their energies and all their funds.

Mr. Daniel McDougall, the President of the Nova Scotia District of the U.M.W.A., some time ago published an open letter setting forth the contentions of the men on strike at Glace Bay. He made a strong point of the assumption that the strikers would be content to return to work if the Coal Company would merely consent to receive a committee of employees—thereby implying that the Dominion Coal Company had not been in the habit of receiving committees of their employees, which, as we pointed out at the time, was an entirely baseless implication. Mr. Acland states that the three strikes in Nova Scotia, that is the strike at Glace Bay and those at Inverness and at Springhill, were all called to obtain recognition of the labour organization known as the United Mine Workers of America. There is not now and there never has been any other cause for these strikes, except the straight refusal of the coal operators of Nova Scotia to recognize this foreign union, and it is evident that Mr. Acland has appreciated Mr. McDougall's subterfuges at their true value.

**Ancient History.**—During the past two years the United Mine Workers have monotonously reiterated certain phrases and certain claims. Some of these were as follows: The United Mine Workers came to Nova Scotia at the request of the miners of Nova Scotia, "entirely unsolicited," as the patent medicine advertisement would say. The United Mine Workers regard contracts as sacred things, for which reason they would have carried out the obligations undertaken by the P.W.A. under the Two Years' Contract. The leaders of the U.M.W.A. have again and again stated their dislike for sympathetic strikes, and have—for Canadian consumption only—made light of that clause in the U.M.W.A. Constitution which specifically provides for such strikes, when it is considered they will "conserve the best interests of the U.M.W.A. as a body."

In view of these oft repeated statements some excerpts from the proceedings of the Convention of the U.M.W.A. at the end of 1905 are interesting. That Convention received its impression



of matters in Nova Scotia from a report the nature of which is best illustrated by a few quotations. "At the Grand Council of the Provincial Workmen's Association held in Halifax last September, Charles O. Sherman was given a hearing. . . A movement is on foot to try and get Mr. Sherman to speak at the various centres so that the body of workers will have an opportunity to hear him. The 'safe and sane' men in the P.W.A. are kept busy trying to destroy the growth of the seed planted, but that is impossible." One might call this sort of thing "ground-bait," but it is a little hard on the fish that is hooked to claim that the hook was an "invitation."

The Three Years' Contract is referred to as a "pistol" forced upon an unwilling body of men who could not resist, and the report flouts any wage contract based upon an "identity of interests basis," enunciating the doctrine that "labour is entitled to all it produces." The Three Years' Contract is also attacked because it provides that the employees should not attempt to restrict the sale of coal, which the report remarks "precludes any sympathetic strike." Evidently sympathetic strikes met with the approval of the U.M.W.A. in 1905, and their Constitution is the same to-day. Is not a sympathetic strike, or a union that approves of sympathetic strikes, a conspiracy to restrict the facilities for the mining of coal? The report makes queer reading in face of the prosecution of the coal operators in Nova Scotia by the U.M.W.A. on a charge of conspiracy.

The "invitation" which the miners of Nova Scotia gave to the U.M.W.A. was exhorted by the lavish expenditure of large sums of money. This was quite a natural move on the part of the leaders of the U.M.W.A. It has long been the policy of the heads of that union to control the whole of the great coalfield which occupies the eastern half of this continent, and to consolidate their power throughout the length and breadth of the Appalachian coalfield from Alabama to Cape Breton. This is the policy of the U.M.W.A. Whether it bodes any good to Nova Scotia is for the Nova Scotian to say, and he is saying unmistakably that it does not. It is, however, quite time that the U.M.W.A. threw off the pretence of an "invitation" to Nova Scotia.

The respect of the U.M.W.A. for a brother labour organization is shown by the manner in which they conducted the strike at Inverness, which, as the Deputy Minister of Labour points out, was a "closed shop" of the P.W.A. The sacredness of a contract to the U.M.W.A. is shown by the strike at Glace Bay, which was called, fatuously enough, at a time when the Two Years' Contract had only six months to run, and called also by men who had taken a leading part in the making of that contract.

**Rescue Apparatus for Mines.**—The First Report of the British Royal Commission on Mines, issued in May, 1907, dealt very fully with the use of breathing appliances, and the merits of the different types of apparatus in the present stage of development. In the Second Report the commission has dealt with the organization and ambulance and rescue work, and reviews the experience of the past few days in this regard. The commission report having visited many rescue stations both at home and on the Continent of Europe, where they remark the use of rescue apparatus is becoming general. In Austria their provision is compulsory, and the regulations of the French Government of a similar character became effective at the beginning of this year. In Belgium also the law requires the provision of rescue apparatus. The commission remark: "Our attention has also been drawn to a recent instance in which breathing apparatus was used with success in a colliery in Nova Scotia in dealing with an underground fire. We understand that the establishment of the rescue station of the Dominion Coal Company was due to the occurrence of several underground fires, two of which were so serious as to necessitate the flooding of the pits; and that since the fire at the Sydney mines, the Nova Scotia Steel & Coal Co. has decided on a similar course." The commission expresses its opinion that rescue apparatus is of proved value in case of

underground fires, and that systematic provision of apparatus and for the training of men in its use should be pursued with greater energy. The commission also expresses the opinion that men trained should not be expected to be prepared for a call for their services "outside their district in order to supply the needs of collieries where no provision has been made for such occasions of emergency, and it places an unfair burden of responsibility on those owners who have taken the precaution to have men trained. We do not think any colliery owner should excuse himself on the ground that his mines are not liable to explosion or to fires. . . . Having regard to the experience of recent years, no owners should be rash enough to regard themselves as entirely immune against risk of explosion." In concluding its remarks on the organization of rescue corps, the commission sums up the matter very definitely, as follows: "We have, therefore, come to the conclusion that the provision and use of breathing apparatus should be general throughout the country, and that every mine should either be provided with a properly trained brigade of its own, which appears to us the best arrangement, or have the right to call for a sufficient number of equipped and trained men from a rescue station."

The report makes a strong plea for the combination of the work of the St. John's Ambulance Association with that of training in the use of special devices, and instances several cases where even an elementary knowledge of first aid would have saved life or prevented suffering.

**North Atlantic Collieries, Limited.**—The Dominion Coal Company has sub-let to the North Atlantic Collieries Co., Limited, the successors of the old Gowrie & Blockhouse Company, a strip of territory, passing through a lease of the Coal Company which intervenes between the North Atlantic Company's submarine areas, and the land workings. The North Atlantic Company will now commence to drive tunnels through the sub-leased area, which will take about two years to reach their submarine take. The line of the tunnels will occupy almost exactly the trough of the narrow coal basin which forms the Morien Coalfield. The North Atlantic Company estimate that the submarine area of the Blockhouse Seam, which will be reached by the new tunnel, contains available coal to the extent of 56,000,000 tons. The Blockhouse Seam is generally considered as the equivalent of the Hub Seam in the Glace Bay Basin, and of the Barachois in the Lingan Basin, but there is considerable doubt about the proper correlation of the Glace Bay and the Morien Basins. This extensive exploration which is projected by the North Atlantic Collieries Company will doubtless afford interesting data in this connection.

## ONTARIO.

**Cobalt, Dec. 4.**—The first consignment of ore to be sent out of the South Coleman district, except from the Temiscaming, was recently shipped from the Beaver mine. This ore is from the vein discovered some months ago, which is still being worked and continues to show good values.

Several of the Gillies Limit lots acquired in the recent sale are now being actively worked. Among these is A 54, for which was paid the second highest price of any of the properties. It is stated that the owners of lot A 91 are prepared to spend fifty thousand dollars in developing their holdings. This property is one on which a three-inch vein was found. Some time ago a small shaft was sunk to a depth of about twenty-five feet, but the silver values were very low. Favourable results have also attended the work being done on A 48 and A 53. Good veins have been located and traced for a considerable distance.

Considerable uneasiness has been felt lately among the mine managers of this district on account of the T. & N. O. Ry. threatening to place an embargo on freight billed for Cobalt. The congested condition of the traffic between Cobalt and



North Bay has improved very little, and many of the mines have suffered on account of the lack of fuel. The railway claims that the cars are not unloaded as fast as they should be, and as a consequence the yard is always full of freight, much of which it is impossible to get at. The railway commission threatened to place an embargo on freight if this condition was not improved. A great part of this congestion is due, however, to the lack of system in the freight office here, and the inability of the T. & N. O. to handle matters in a businesslike manner. Several of the mines have at one time or another had to shut down for lack of coal, so that the question has assumed rather serious proportions.

The interest in the gold discoveries in the Porcupine Lake district continues to increase, and it is probable that when once the cold weather sets in there will be a considerable rush into this section. So far, however, no work of any consequence has been done and it is impossible to determine the value of these discoveries. There is a considerable feeling that this section will turn out to be a replica of Larder Lake, and there are bound to be many disappointments.

In sinking the shaft on the Wyandoh property, at one hundred feet from the Waldman boundary, and on the continuation of the Waldman vein, good ore was encountered at a depth of nine feet. The shaft was started on the barren end of the vein, but now they have about three inches of smaltite ore with good values in silver. The point at which this silver was encountered is about one hundred feet from where the good showing was found on the surface.

The T. & N. O. Railway is planning for heavy traffic between Charlton and Gowganda during the coming winter, and is making extensive preparations to handle the large amounts of freight expected. New freight sheds and sidings have been constructed, and conditions should be very much better than last year. It is understood that the company has decided to bill goods through to Gowganda, and it is the intention of the road to make arrangements for teams at Charlton to take the freight in from the railway, and negotiations are now under way for the hire of a large number of teams for this purpose. Increased competition and much better roads will serve to bring about a very substantial reduction in the rates that were in force a year ago.

The physical condition of the Cobalt Lake Co. has been steadily improving the last few months. The new vein that was discovered a short time ago has been showing up well under development, and carries a number of stringers of high grade ore. Between the walls there is thirty inches of mineralized area, and in this are three stringers. Assays taken from these stringers have gone over four thousand ounces to the ton.

The recent report circulated about the condition of the Crown Reserve Mine has created a good deal of excitement in various circles outside of Cobalt. There is no truth in these rumours that the mine was flooded, and the management has taken every precaution to avoid such a contingency. The shaft is at present down 200 feet, and drifts have been run on the vein at the 100 feet and 200 feet levels, and connected with a raise over 200 feet from the shaft. The block of ore between the 100 ft. and 200 ft. level, is in good ore, and has scarcely been attacked. The upper level has been stoped out as far as it was reasonably safe to do so, though the management has been very conservative, and allowed a safe margin in discontinuing stoping in this upper level. These remarks apply to the main or Carson vein, but the company also has reserves in the shape of a considerable number of veins, which while they have not the spectacular values of the main vein, nor are they so large, will, when opened up, add materially to this property's reserves.

The Wetlaufer Mine in South Lorraine has shipped another car of high grade ore, and it is understood that two more will be shipped in the near future. All this ore is from development work in sinking the shaft, and drifting on the 140-ft. level.

It is expected that the annual meeting of the Cobalt Central,

which is to be held shortly, will be very stormy. It has been decided by the representatives of the committee that is investigating the affairs of this company to take further action. This is in regard to certain loans which it is stated have been made to the company, and which have not appeared in the financial reports. The Cobalt Central has always come in for a good deal of criticism, on account of the very indefinite statements that have been issued, and it is stated that there has never yet been a complete financial report issued to the shareholders.

The continuation of the mining operations of the Colonial Mine has resulted in the discovery of two new veins. One of these is about 2½ in. in width of cobalt and considerable native silver. The wall rock is also well mineralized for about two feet on each side of the vein, which promises a large amount of milling ore. The main work now being done is in the No. 2 tunnel above Cross Lake, and this is now being connected with No. 2 tunnel. It has been decided to add a tube mill to the equipment of the concentrator. This mill is being operated by electric power from Hound Chutes.

It is expected that the government road from Elk Lake to Gowganda will be completed about the middle of December. This road is in good shape with a very low gradient, and will assist very materially in cutting down the price of supplies going into the country. This winter there will be three roads into that section, one via the C.P.R. and Bisoo, the end of the steel of the Canadian Northern, and the T. & N. O. at Charlton. The former is rather too long to be seriously considered in competition with the other routes, which, as far as distance from the end of the steel to Gowganda is concerned, are about equal.

Considerable progress has been made at the Nancy Helen since the new ore bodies were discovered on the 60-foot level some time ago. Recently in a cross-cut about 80 feet from the Buffalo line a rich stringer about one inch in width was encountered. It is believed that within a couple of weeks another shipment of high-grade ore will be available. At present practically all the work in the mine is being done at the 60-foot level. In the vein that is running towards the City of Cobalt line, about 150 feet has been developed by a drift, and the face of the drift is still about 300 feet from the line. This vein shows a good width of high-grade ore.

After sinking the shaft on the Silver Cross to a depth of 125 feet, diabase has been encountered below this point. It is a very important matter for the company, and will have considerable bearing on the future development of the property. The shaft was started on a cobalt vein carrying practically no values in silver. After the diabase was encountered the vein was much stronger and better defined, and carried higher values in silver.

Another vein of high-grade ore has been cut at the 75-foot level of the Right-of-Way in a cross-cut about fifty feet from the shaft. At the No. 3 shaft, which is between the Silver Queen and McKinley-Darragh, four veins showing high-grade ore are now being worked. This shaft is 95 feet deep, and at the 75 foot level a cross-cut has been run north and south. South 210 feet, and in the north 900 feet. In this latter cross-cut three veins carrying high-grade ore were struck.

The annual report of the Coniagas Mines has just been issued. In addition to the usual statement of ore reserves and work done during the year it also gives a map showing the veins and the amount of stoping and development work done during the year. The ore reserves on October 31st were estimated at 12,500,000 ounces, contained in the following:—

|                                               |           |
|-----------------------------------------------|-----------|
| Vein matter, 3,427 tons—ounces silver .....   | 9,125,500 |
| Milling rock, 103,000 tons—ounces silver..... | 3,432,200 |

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12,557,700

This estimate does not take into account the opening up of a new level in which considerable ore has been found. This level

is being run to connect with the shaft sunk near the south-east corner of the property in the centre of the town. During the year an average force of 118 men was worked. The work done for the year is as follows:—

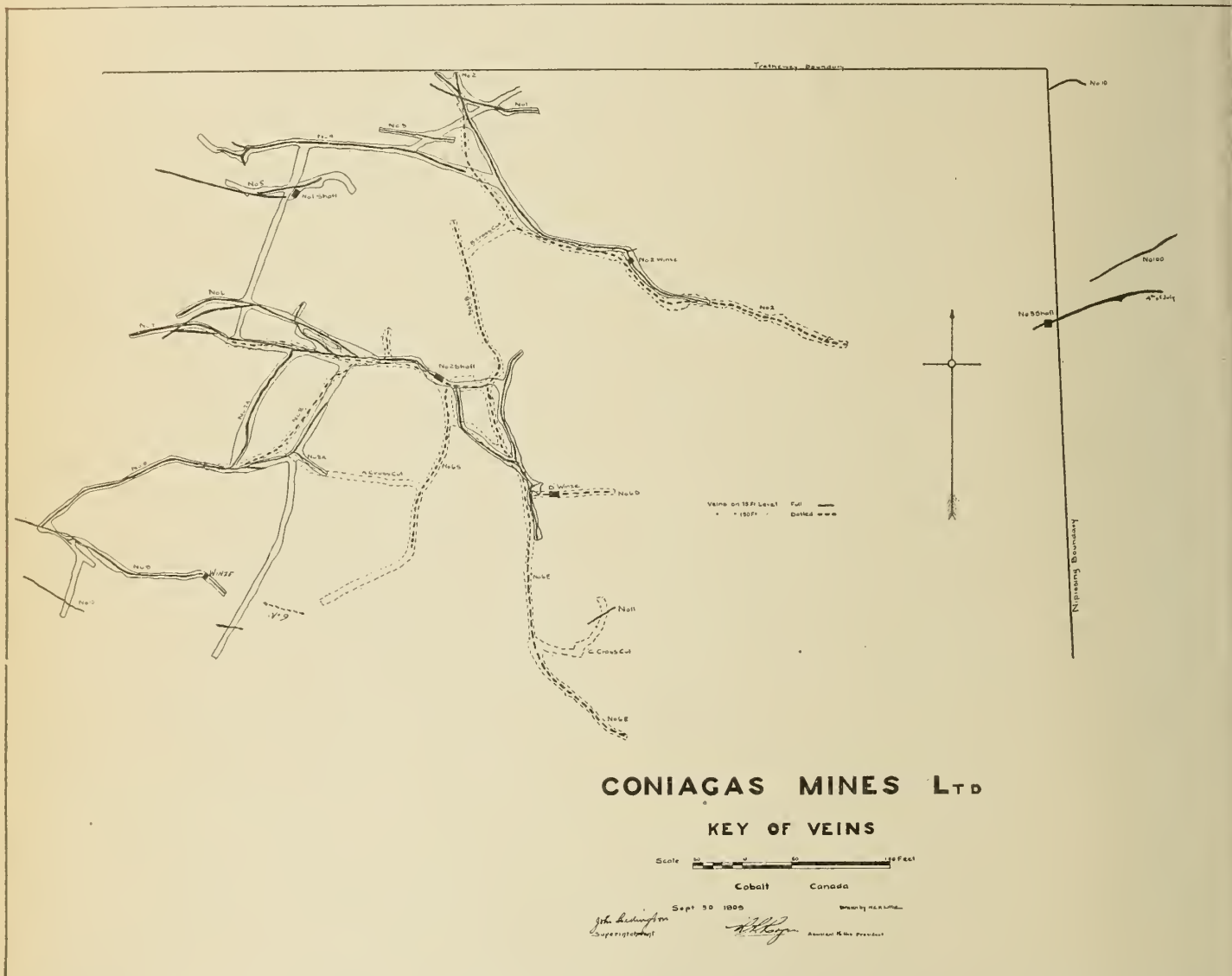
|                         |            |
|-------------------------|------------|
| Shaft sinking .....     | 51 feet    |
| Drifting .....          | 1,254 feet |
| Cross-cutting .....     | 1,254 feet |
| Winzes and Raises ..... | 80 feet    |

In regard to the Coniagas Reduction Company at Thorold, the report states that in order to take up part of the floating debt of the subsidiary company that was formed to take over the smelter, and to provide further working capital, the directors decided to take up 1,494 more shares of stock at par. The finan-

There has been considerable improvement in the prospects of the Lawson property during the past few weeks. From the main drift on the "Silver Sidewalk" a cross-cut has been run to No. 5 vein, and some drifting has been done. At this depth there is considerable showing of high grade ore. A crosscut was run at the 88-foot level.

**Kenora Mining Division.**—The latest advices from Gold Rock report that the Swede Boy or Mining Location H.P. 259, on upper Manitou Lake, is to be put on a paying basis almost at once, in fact a small stamp mill has already been placed in position on the ground and as the property shows evidences of being a rich one we expect to hear shortly of good returns.

One of the healthiest signs of this district is the fact that



cial report shows a balance of \$140,014. During the year three dividends amounting to \$360,000 were paid. The experiments that have been conducted with the Redington drill, which was invented by Mr. Redington, superintendent of the property, have been successful, and the Coniagas Company has acquired 55% interest in it.

During the month of November there were shipped from Cobalt 32 cars of high grade ore, 7 cars of medium and 37 cars of low grade ore, aggregating 4,959,651 lbs. Total shipments for the first eleven months of the year 1909 amounted to 28,075 tons.

Underground work has again been started on the Red Rock and Green Meehan. Both these properties are now being operated by the same company, known as the Cobalt Consolidated Silver Mining Co.

local capital is being invested in the properties here which tends to show that the properties are bona fide mineral claims and good ones too in the belief of the residents.

The Northern Development Co. has now got its 10 stamp mill completed and is working double shifts. Their new boiler house is completed and the boilers installed. The shaft house has been enlarged and a tramway built between the shaft house and the mill, and taken altogether everything looks to be shipshape and ready for a steady run of good work. A contract has been let for 1,800 cords of wood.

The Laurentian has been shut down after running out what ore was in the bins and awaits the results of the legal proceedings now progressing. It is however confidently expected that the mine will be in full swing again by Dec. 15th.



In the Detola Company's mine has been built a new blacksmith shop. The shaft house has been boarded in and everything made snug for the winter. The old blacksmith shop has been made over into a comfortable and commodious dryhouse for the miners. The shaft is now down below the 200 foot level and it is the intention of the management to sink to the 250 foot level before cross-cutting; when this level is reached they intend to drift along several different veins which they have cut and have already laid out cross-cutting amounting to 700 feet.

The master mechanic is now on the ground at the Minnehaha property, near Beandro's Landing, waiting till the lakes freeze up so he can get in the new plant which is to be installed this winter.

**Historical.**—The Kenora Mining Division of which to-day there is little heard was once and will be again one of the foremost gold fields of Canada.

The seeming lack of interest in this field at present is, in my opinion, due entirely to bad management, gold stealing by miners, and last, but by no means least, "wild-catting" of the most deliberate and cold-blooded description.

In 1900 there were operating in this district the following mines, not merely prospects staked out and held, but bona fide mines:—

| Mine.                    | No. of Stamps. | Weight of Stamps. |
|--------------------------|----------------|-------------------|
| Mikado .....             | 20             | 850 lbs.          |
| Sultana .....            | 30             | 850 "             |
| Olive .....              | 10             | 850 "             |
| Regina .....             | 8              | ...               |
| Big Master .....         | 10             | 1,050 "           |
| Sakoose .....            | 2              | 850 "             |
| Decca .....              | 10             | 850 "             |
| Olive .....              | 15             | 900 "             |
| Independence .....       | 10             | 850 "             |
| El Delora .....          | 2              | 950 "             |
| Lake Harold .....        | 5              | 850 "             |
| Headlight .....          | 2              | 1,050 "           |
| Lucky Coon .....         | 5              | 850 "             |
| Alice A .....            | 2              | 850 "             |
| Golden Winner .....      | 5              | 900 "             |
| Minnetakie .....         | 10             | 900 "             |
| Haycock .....            | 2              | 850 "             |
| Shores .....             | 2              | 950 "             |
| Rainy River Develop. Co. | 1              | 1,250 "           |
| Foley .....              | 20             | 750 "             |
| Empress .....            | 10             | 950 "             |
| Golden Star .....        | 10             | 1,020 "           |
| Hammond Reef .....       | 40             | 900 "             |
| Crown Point .....        | 5              | 850 "             |
| Gold Panner .....        | 10             | 950 "             |
| Glass Reef .....         | 10             | 1,000 "           |
| Sawbill .....            | 10             | 850 "             |
| Combine .....            | 10             | 850 "             |

These mines all give from assays, made by reputable people and firms, values warranting development work; and many gave promise of surpassing even the hopes of their owners. To-day, except for some six or eight, these mines are not being worked and their plants are lying idle, in some cases being looked after by caretakers. In many cases, however, the machinery is rusted and useless, not because the properties are valueless but because the shareholders never got the consideration, or even the smallest chance at a fair, honest deal that should have been theirs. To take the causes of trouble in their order and to show that laying the blame on these conditions previously mentioned is not a mere fancy, it can be pointed out that men were placed in charge of mines in this district who were not fitted, either from point of education or practical experience to fulfil positions one tenth as exacting. Before a mining property had been duly tested, either by sinking, drifting, cross-cutting or even diamond drilling, the inexperienced, ignorant or wilfully dishonest man

in charge would send away his order for expensive mill machinery, often times ordering a class of machinery so totally unsuited to the needs of the particular property in question as to be absolutely useless.

Men have been put on as mine captains whose only claim to the position was having married somebody's wife's sister's cousin, and who had so small a conception of what was meant by a shift's work that they never knew what to expect from the men in regard to a fair equivalent value of work done for the moneys expended by the employers.

Apart from this matter of not getting for the absent shareholders a decent return in work done for their investment, how could men so magnificently ignorant of even the fundamentals of mining direct to the best advantage what little work they might manage to coax from their amused miners? Their lack of knowledge is apparent to-day in many of the mines; but without raising hostility and heart burnings it would be impossible to give names either of people, mines, or places. So, knowing that anyone really interested can to-day get for his own benefit data to prove every statement here given, we will leave this phase of the subject and go on to the second, that of gold stealing.

To-day, in the town of Kenora, with any group of say 10 men, if gold mines or properties be the topic of conversation, it is almost certain that one member of the group will hold out his hand to show a gold ring, or his cuffs to show his cuff buttons, remarking, "These are some of the —gold; boys, she must have been rich!" Many of the blacksmiths will tell of smashing up quartz with their hammers and putting it in an iron spoon in their forges to get a button for so and so, so that he could get a ring made from the "specimens" he brought to town from such and such a mine. One man bought an overcoat from a local tailor and paid for it in specimens he had brought in from the mine. The tailor got \$200 for the gold taken from these specimens. This man, asked if he had no compunctions about taking these specimens, said: "Say, one night I was out of my bunk and I saw two men moving away round an out-house over the snow. I sneaked after them quietly. They went up into the loft of a stable, and I got a good look at them from where I lay hid in this stable as they came down. They were the mine captain and the storekeeper. When they had gone I felt sort of curious as to what had taken them up there, so went to find out. I found under the hay a sack full of specimens, and those I looked at were more gold than quartz, for we were then in the very richest part of the vein. I thought I had as good a right as they had to those specimens, so I took the sack and carried it into the bush and buried it in the snow, covering my tracks as best I could. Next day I went down to get it but the bag had gone; someone had followed me, and though I did my best to find what had happened to them I never ran across those specimens again. Now, if the shift bosses and mine captain could take the stuff like that, why shouldn't I?"

This is only one case—there are many others.

I have it on reliable authority that a miner was showing a friend a sample of gold containing a one ounce nugget on the main street of Kenora. The manager of the mine came past and recognized the sample as being from his mine. He asked to see it, looked it over and asked if it had not come from such and such a mine. The miner said "Yes." So the manager put the specimen in his pocket, asserting that as a representative of the company it was up to him to keep it. The miner, however, ordered him to give it back, threatening if he did not to expose him for stealing gold from the same mine! And these were the men sent to this district by the shareholders to safeguard their interests! Men who in most cases were well and even liberally paid and whose receipt of their salary was, on account of their ignorance and lack of technical education, almost a steal!

To go now to the last case, that of wild-catting, I am not going to mention the ordinary everyday scheme of taking



samples from one claim and placing them on another; and then taking the prospective purchaser to view this carefully salted vein. That of course has been done here and perhaps in no case more daringly than that of the would-be tin mine, where the dishonest promoters were convicted of having loaded the face with tin ore. Conviction was easy, for not only was it the fact that such rock had never before been known to contain tin ore, but also, in spite of the risks they were running, the men were too lazy to destroy the barrels in which the ore had been shipped to them. Many readers of this paper will doubtless remember the circumstances accompanying this scandalous transaction. This is not, however, the type of wild-catting I refer to. I have reference to the kind that causes men to sink a pit in barren rock where there never was nor could be any sign of auriferous ore, simply that the partner or the stock market may escape criminal proceedings for trying to sell stock in a mine that never existed.

In one case an old miner who had some remnant of a conscience left approached the manager to try and convince him of the futility of working further in the barren country rock and was told he was paid good wages to hold his tongue. In another case, after working for months in barren rock, a company that had sold much stock to the public and had never had even a quartz vein on which to sink, set a diamond driller to work on a small stringer some 500 yards away from the main shaft. The driller came into camp one night and whispered to the miners that they had struck it rich with the drill on the stringer at 100 feet and gave dimensions of the vein cut by the drill and its approximate richness. The miners bit, and spent all the wages coming to them for shares in the mine. The manager wired his directors that the miners themselves believed so heartily in the mine that they were buying shares. Stock rose, and within six months the mine closed down. The diamond drillers had misled the miners. It is this wild-catting that has been so disastrous. In this regard we must in fairness report at least one case of which we know, in which the manager of a mine resigned his position rather than falsify his reports as ordered by those who were placing the stock on the market.

Since all these facts are being gradually assimilated by the public, and even the unfairly treated shareholders are beginning to see that the blame should be laid upon the individual and not on the property, this district is experiencing a gradual return of public interest, and before long we may again see the whole district busy and work resumed upon the many valuable properties now lying idle with that idleness that is a lasting record of the evil of deliberate dishonesty.

#### BRITISH COLUMBIA.

**Roseland.**—The shipments of ore from this camp still continue to average about 5,000 tons per week, the Centre Star, Le Roi and Le Roi 2, Ltd., shipping and the concentrator at the Le Roi 2, Ltd. treating 260 tons of "second-class" ore per week. The lessee of the Velvet-Portland property shipped 35 tons of ore from the dump during the past week, which will give smelter returns of about \$32 per ton. Work is being prosecuted on the Velvet property with a view to shipping steadily as soon as the snow roads get in good condition.

The shaft on the Josie property of the Le Roi 2, Ltd. is now down below the 1,250 level and nearing the 1,300-ft. level. The company is stoping and shipping from five to seven hundred tons per week to Trail smelter.

Two diamond drills are at work in the Le Roi and considerable drifting and stoping is being done, and occasional shipments made as ore accumulates.

The usual steady progress is noticeable about the Centre Star group of the Consolidated Co. Shipments are averaging 4,300-4,500 tons per week of average grade ore. The claims lately acquired are being opened from the lower workings of the

Centre Star and War Eagle mines, while considerable diamond drill work is being done, on the surface as well as from the underground workings. At the Trail smelter this company, in addition to custom ore, is receiving approximately 4,500 tons per week from its Snowshoe mine at Phoenix, 300 to 450 tons per week from the St. Eugene and occasional shipments of \$42 product from the Richmond-Eureka. The returns from the Trail smelter for the month of October amounted to \$412,865. While this is not as high a figure, by any means, as prevailed in July and August, still if it is maintained to the end of the present calendar year it will carry the total figure for the smelter over the \$6,000,000 mark, which will be close to a million dollars greater than any previous year in the history of the plant. Of course this is a natural consequence where an industry is progressing and enlarging. This works is now turning out silver .999 fine, fine gold, base bullion, copper matte, pig lead, lead pipe, bluestone and electrolytic bearing metal.

The buildings and foundations are being hurried along at the Fife mines, to accommodate the 100-h.p. boiler and air compressing plant when it arrives. As soon as this mining plant is working the management intends to open the property on a larger scale than it has been worked hitherto.

**Boundary.**—It looks as though the men behind the billion dollar copper combine had not overlooked the Boundary district in making their calculations toward controlling the copper output of this continent. It is rumoured that the Granby Consolidated Mining, Smelting and Power Co. will very likely be absorbed if the deal is consummated. If the Granby Co. is acquired there is no doubt that the British Columbia Copper Co., which now controls the New Dominion, will also be taken in. As it is, this property is controlled by New York capitalists, many of whom are closely allied with the men connected with the proposed copper combine. It does not seem reasonable to think that the men arranging the merger could afford to overlook a copper-gold producing district that is now putting 30,000,000 to 35,000,000 lbs. copper annually on the market and which under normally favourable conditions, with the B.C. Copper Co. and Granby working steadily, could possibly double this output.

Former State Geologist of Minnesota, H. V. Winchell, now connected with the Guggenheims, is in the West examining various copper mines and it is said that he is headed for the Boundary where in particular he will look over the Granby property. It is not likely that the merger crowd will show their cards until they have matters well in hand, so that all the outsiders can do until that time will be to keep guessing. Even if the Granby were included in the merger it might not benefit this district any, for in the course of curtailing the copper output work might be cut down at the local mines. The merger is a big game in which someone is going to be damaged. If the price of the red metal is controlled by any other means than the law of demand and supply then it is very likely that someone may have to pay the piper. But we will know more about this phase of the situation later on.

The Granby mines touched still another high mark when 30,577 tons were shipped for the week ending Nov. 13th. At this rate Granby shipments will run over the million ton figure by the end of the year, but will not exceed the shipments of last year by very much. Despite several months' shut-down, the B.C. Copper Co. will exceed last year's shipments, while the Snowshoe will ship 100,000 tons more this year than in 1908.

It is hoped by local people interested that the Granby directors while in convention on December 7th, will see their way clear to declare a dividend. It is understood the company is in a good position to do this and that it merely rests with the directorate.

The Granby Company, the B.C. Copper Co., the Le Roi Mining Co., and the Con. Mining and Smelting Co. of Canada, Ltd., have all had engineers working in the new mining camps on the Coast



and in the northern part of British Columbia this season. The districts visited included Valdez Island, Queen Charlotte Islands, Portland Canal, and the several districts within a radius of 100 miles of Hazelton on the Skeena River. The prospects in these districts are reported as being favourable, but it remains, of course for greater development to prove the value of the ore bodies at depth and to determine their permanency.

It is stated that the B.C. Copper Co. earned a net profit of \$38,000 during the month of October and produced and sold its copper at 8.8c. per lb. It is pleasing, of course, to see the Boundary mines touching these low cost figures, but conditions in this district are not yet ripe enough for the maintenance of this low cost the year 'round. It is stated that the Granby Co. could produce copper at 5c. per lb. if the future of the mine was not kept in mind; that is, if the management neglected development and only worked on getting out and smelting the ore. So it can be seen that the average figure for a year must be taken as a criterion.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Sydney, N.S.**—No official announcement has been as yet made as to who will direct the destinies of the new steel-coal merger, though it was generally expected that after the meeting of the local officials, held here on Nov. 27th, some definite announcement would be made.

When seen, Mr. Plummer had nothing to say in connection with the business of the companies, or who the new general manager to succeed Mr. Jones would be, but intimated that an announcement would probably be made within a short time.

Mr. Plummer left for Montreal, where there will be a meeting of the directors.

In a circular addressed to the heads of the departments at the plant, Mr. Plummer assured them their relations with the company and their respective positions and work with those now or hereafter in charge at Sydney and among themselves, were all matters of intimate personal concern to himself, and he added that no official need feel that the departure of Mr. Jones affects the security and comfort, or emoluments of his own position.

On the sailing of the steamer Fornebo, which left International Pier on Nov. 27th with a full cargo of coal for Quebec, the Dominion Coal Company shipments up the St. Lawrence were completed for the season. The total shipments amount to 960,000 tons approximately. The shipments for 1908 were 1,344,200 tons, the decrease being due to the strike.

The steamers Christian Knudsen and Borgestad completed their charters with the Coal Company last week, and several others will finish before the end of this week. The company has had eleven chartered steamers this season, besides their regular steamers of the Black Diamond Line. Last season the company only had two chartered boats in the Louisburg-Boston trade, but two more will be added, making a total of four steamers, besides its own regular fleet. Shipping will be continued for the winter months from Louisburg.

### ONTARIO.

**Toronto.**—At Osgoode Hall, Toronto, before Chief Justice Falconbridge, in the non-Jury Sittings last week, John H. Casler, of Los Angeles, Cal., began an action against Messrs. Geo. J. Blake, Adam Witzel, Wm. J. Cusher, and John F. Vogt, directors of the Grace Mining Company, the properties of which are situa-

**East Kootenay.**—The coal measures of the South Fork of Old Man River, is said, give nearly as much promise as did those of the Crow's Nest Pass district in early days. As there are two trans-continental railways hurrying toward this section it will be opened to the surrounding market in the near future. An important strike has been made on the property of the Carbon Hill Coal Co. in this district. As there are indications of oil, that promise well, prospecting is being done in this direction. The Chicago-Alberta Oil Co. is erecting a drilling plant about seven miles from the summit.

A well-known mining man, A. Gowing, was in the Lardeau within the last few weeks looking after personal interests there. He has lately been operating in the Queen Charlotte Islands, where he has staked 17 claims near Tasso Harbour. The ledge, which carries from 6% to 17% copper, \$1 gold and \$3 silver per ton, is nearly 360 feet wide where opened up and can be traced for several thousand feet. The group has been bonded to eastern capitalists at \$400,000.

ted on Eagle Lake, in the Rainy River district. The plaintiff seeks to recover \$12,000, the amount of a mortgage on the properties. Mr. Casler claims the lands, comprising twelve parcels, have not been paid for. The defendants have entered a counter claim for \$150,000 against Casler for alleged fraud and misrepresentation.

The defendants, all of whom are Buffalo people, claim that while the plaintiff was a director of the company he induced the other directors to give him the mortgage, which, they say, was not executed under the authority of a properly called meeting of the directors.

The plaintiff's evidence engaged the Court for half a day. Mr. Casler, in cross examination, denied that he had ever told his assistant that he would keep those Dutchmen in Buffalo busy raising money, and that he could sink it just as fast.

A former secretary-treasurer of the company said he thought none of the directors knew anything about mines. Before Mr. Casler became president of the company he was in the plumbing line.

According to the evidence of Wm. Richards, a mining engineer, foreman for the company, the plaintiff, while manager of the company misled the directors as to the values of the property. He was in the habit of pouring gold dust on the ore matter while demonstrating its value by means of the panning process. As regards the amount of work done by Casler, the witness said he spent most of the time in the office reading his bible or sailing around in a motor boat. Similar evidence was denied by Casler when cross examined by the counsel for the defence on the first day of the trial.

**Kenora.**—Pending the outcome of legal proceedings now in progress, active mining operations at the Laurentian mine have ceased. The official referee at Toronto is calling for tenders for the assets of the Imperial Mines Co., including the buildings, plant, machinery and supplies. The superintendent of the mine, R. B. Nickerson, who paid a brief visit to Kenora last week, has departed for his home in California, accompanied by his father.

On Saturday last Jas. Sherman arrived at Dinorwic from Kenora, en route to the Manitou, where he has been engaged for the past three months erecting the ten-stamp mill at the Paymaster mine. The mill is now in full commission, reducing the extensive ore dump which has accumulated, into bullion. No record of the result of the mill's performance up to date is available as yet, but it is understood that the percentage of gold is quite satisfactory to the management.

**Cobalt.**—The new addition to the McKinley-Darragh concentrator is nearing completion and will have a capacity of 120 tons daily. On the Savage claim belonging to this company another mill of smaller capacity will be erected, probably treating twenty-five tons per day. In addition to this the high grade production is considerable.

### ALBERTA.

**Frank, Nov. 26.**—Andrew Laidlaw, of Spokane, president of the Galbraith Coal Co. of Lundbreck, this province, has brought before the Railway Commission the charge of gross discrimination against the mines of this district in the new coal and coke tariff of the C.P.R., which became effective on October 4th.

Mr. Laidlaw found the new tariff so to discriminate against the product of his mine, placing his company at so serious a disadvantage in the domestic coal market, that he caused complaint to be laid before the Railway Commission, and a hearing on the complaint was had at Regina a few days ago.

The Galbraith Company complained that in the new tariff as compared with the old one, there is a discrimination against the mines of The Pass in favour of Lethbridge, and specified that in the rates from Lundbreck and Pass points to 147 points named, there is an increase of from five to fifteen cents a ton; to 20 points the rates remain the same, while in a few instances there is a slight reduction.

It was shown that from Lethbridge to all points, except in a few instances where the rates remain the same, there was a general reduction running from 25 to 40 cents a ton. For example, from Lundbreck to Regina, there was a reduction of five cents a ton, while from Lethbridge the reduction was 30 cents, thus making a considerable increase in the differential in favour of Lethbridge, which formerly had been but 15 cents.

Other specifications show that the rate from Lethbridge to Cranbrook is \$2.30 for 204 miles, while from Lundbreck to Cranbrook the rate is \$2.25 for 127.7 miles, and that west of Cranbrook the rate is the same from both places.

Other specifications show that the rates from Lundbreck and Pass points to points south on the Alberta Railway and Irrigation Line, the road running from Lethbridge to Great Falls, now owned by the C.P.R., are greatly out of proportion, as, for instance, from Lundbreck to Raymond the rate \$1.60, while to Magrath, less than ten miles distant, the rate is \$2.30.

## MINING NEWS OF THE WORLD.

### GREAT BRITAIN.

The Central Zinc Company's plant at Seaton Carew, West Hartlepool, has a smelting capacity of about 35,000 tons of zinc blende per annum, which should produce about 10,000 tons of spelter. This company is a subsidiary of the Sulphide Corporation, formed to treat the Broken Hill Central mine's zinc blende. It was formed in 1906, since which time extensive experiments have been carried on prior to the starting of the plant at West Carew in May, 1908. The distillation furnaces are of the recuperative type. The pottery is 315 feet long, the upper floor of which is constructed of reinforced concrete. The roasting furnace is steel-panelled, 105 feet long by 75 feet wide, and the distillation works are 415 feet long by 56 feet wide. All the latest developments for zinc blende treatment have been adopted.

At a meeting of the Cardiff Chamber of Commerce on Nov. 24th, Mr. Griffiths (President) said there was a decrease in shipments at the South Wales ports last month of 250,000 tons. He attributed this to decreased output consequent upon the Eight Hours Act. Other speakers who are connected with the collieries

**BRITISH COLUMBIA.**

**Sheep Creek.**—One of this Province's wealthiest mineral districts is the Sheep Creek Valley. Development work has been carried out during the past summer to a very large extent, as well as a large amount of exportation of the ore. Mr. W. G. Burnham, who has been inspecting that district and the properties opened up, arrived in the city the other day, and in an interview gave a long and very interesting resume of the work done.

From the Queen, in all some \$600,000 has been exported. A 20-stamp mill has been set up, and the property is showing up remarkably well. It has been tunnelled for some 500 feet. It was purchased a couple of years ago by a Wisconsin syndicate for \$175,000.

Second in importance is the Mother Lode, a property recently purchased for \$150,000 by Mr. John MacMartin, of Cobalt. Development work has occupied all the time of the owners, and some \$500,000 worth of ore has been exposed. The lower tunnel taps a rich vein of from three to five feet with an excellent showing. In addition to this extensive work, new offices and bunk-houses have been erected; a new trail has been constructed and a two-mile road built to a location where a mill will be constructed shortly.

The Nugget claim is the next most highly developed property. For the past twelve months a four-stamp mill has been in operation, turning out from \$8,000 to \$10,000 monthly entirely from the stoping. Four levels have been opened for some 500 feet. In the lower tunnel a three and a half foot high grade milling ore has been uncovered, which runs from \$40 to \$90. There is half a million dollars worth of ore in sight alone, and when exportation begins, it is expected that the claim will be one of the richest in the district.

The Golden Fawn property has two parallel veins to the Nugget claim. It is only in the early stages of development, but the surface outcroppings show from \$83 to \$225. Two tunnels are being excavated, and a paystreak has been unearthed in the centre for some 20 feet, assaying at \$185 to \$225. The property is being controlled and managed by Vancouver people and has started with a better showing than the others.

The Bonanza claim is another wealthy property, and was taken over last week for \$75,000 by a Vancouver syndicate.

stated the output had decreased from 10 to 15 per cent. since the new Act came into operation, and this despite the fact that more miners were now employed in pits.

### SOUTH AFRICA.

**Johannesburg.**—At the meeting of the Transvaal Chamber of Mines on Nov. 17th, Mr. Reyersbach made reassuring statements as to the native labour position. The present shortage gave no reason for anxiety. The speech has made an excellent impression.

Definite arrangements have been come to with the Government on the bewaarplaatsen question. The companies entitled to the ground will receive a fixed allowance of 2s 6d per ton treated, plus 25 per cent. of the net profits. No allowance is to be made for capital expenditure.

Development work for October on the Van Ryn Deep proved a record, 361 ft. having been driven on the eastern extension. Assays give 9 dwts. over 36 ins. for 50 ft. of driving from the shaft.



Upon technical advice, the Midas Deep is to shut down the mine and mill, but operations will be continued upon the treatment of slimes.

Mr. Webber, acting as chairman at a meeting of the Transvaal Chamber of Mines, made a speech in which he bade farewell and paid a tribute to Mr. Reyersbach, who is taking up a partnership in London in the firm of Wernher Beit & Co.

Mr. Reyersbach referred to the general situation on the Rand. He admitted that there was a shortage of native labour for the mines at present, but thought there was no cause for anxiety. All the colonies under the Union would be bound to take the utmost interest in the mines. He announced that an equitable settlement had been practically arrived at with the Government on the bewaarplaatsen question on a sliding scale basis. He urged the discontinuance of the monthly reports of output, labour supply, working costs, etc., suggesting that yearly reports would be sufficient and, indeed, the more advantageous.

#### AFRICA.

##### Nigeria.

With the recent revival of interest in West African gold mining, the other mineral resources of the country are evidently not to be neglected. It has been announced that the Champion Gold Reefs of West Africa has abandoned its option on a gold area in Apollonia, and has taken up tin mining in Nigeria. Now, the Nigerian Tin Corporation has been formed with a capital of £100,000, "to acquire and develop alluvial tin areas in Northern Nigeria, and, as suitable opportunities may offer, to co-operate with existing or future organizations in the same field." The frank admission that the Corporation has at present no properties, nor even options on any, disarms criticism.

##### Egypt.

There is every indication of growing activity in the oil industry in Egypt. The most recent company to make its appearance is the Helouan Petroleum Company. The capital is £60,000, in £1 shares, of which £20,000 is set aside for working capital, and the objects of the concern are stated to be the developing and dealing with petroleum and other mineral rights in Egypt and the Soudan, the Red Sea Littoral and Sinia Peninsula, and elsewhere in Northern Africa. A prospecting license has been granted by the Egyptian Government over an extensive area to the south-east of Helouan, about eighteen miles from Cairo, and already strong indications of petroleum have been discovered. The license is renewable yearly on payment of £25, and royalties are payable to the Government as follows:—6d on every ton of coal, 6d on every hundred gallons of raw oil and 3s on every ton of mineral wax or other substances produced.

#### RUSSIA.

Increasing activity is reported in the Bakn oilfields, and for the first nine months of the year the production reached a total of 367,700,000 poods, as against some 344,440,000 poods for the corresponding period of 1908. During September the output amounted to 43,800,000 poods. This was rather less than in August, a circumstance explained by the fact that the month is a day short.

Active development operations are reported in the oil districts of Southern Russia, the latest to attract attention being Maikop, which lies within easy distance of the Black Sea. Already boreholes have yielded highly encouraging results, and refineries are now being erected and equipment installed.

#### AUSTRALIA.

Sydney, Nov. 24.—Dissensions are reported among the Northern colliery proprietors, due to the alleged previous knowledge by some of them that a strike was coming.

A shipment of 3,000 tons of coal has arrived from Newcastle. The miners' congress has decided to handle it, as it is intended for use on the railways. Another shipment of 6,000 tons for the Fiji Islands has been intercepted at Norfolk Island and recalled.

The Southern miners are restless, and it is rumoured that they desire to break away. A non-unionist has been assaulted in the western district, and two strikers have been arrested.

The Southern proprietors have notified Mr. Lee, the Acting Premier, that they do not agree to the men's proposal for an open conference to discuss the principal questions in dispute. They are, however, willing to refer the dispute to the Wages Board.

#### NEW ZEALAND.

The Minister of Mines, Nov. 24th, declared that since the Greymouth miners' union cancelled its registration under the Arbitration Act he had been endeavouring to arrange a working agreement on this crucial point. He considered that trucking from the surface would involve an extra charge of fourpence per ton, equal to £4,000 on last year's orders. "We could not stand it," said the Minister. "I proposed reference to the Conciliation Commissioner or the Arbitration Court, but the men refused. We cannot see our way to make further concessions."

#### UNITED STATES.

Arizona.—The Miami Copper Company are attempting to enlarge considerably their ore resources by means of diamond drilling. The company owns 260 acres of unproven ground.

Washington.—The gold mines of the United States produced \$94,560,000 worth of the precious metal during 1908, according to the Geological Survey and the Bureau of Mines, which have co-operated in preparing an analysis of the reports from private refineries and Federal mints and assay offices.

The total gold output was 4,574,340 ounces, a net increase in value of \$4,124,300. Colorado led with a productive value of \$22,871,000; Alaska was second with \$19,858,800; and California was third with \$19,329,700.

Porto Rico was the smallest producer with a total of only \$600.

The Philippines show an increase of \$219,800 to a total of \$284,500.

Some States of the Union, usually not associated in the public mind with gold mining, make a showing in the reports. In fact twenty-one of the States and territories, not including Porto Rico and the Philippines, are producing gold. Texas produced \$500 worth in 1908; New Hampshire mined \$3,700 worth, and somewhere in the vast grazing country of Wyoming was produced \$7,600. The summary shows a net decrease of 4,073,900 ounces of silver, with a value of \$28,050,600. The total production was 52,440,800 fine ounces.

Montana leads with a production of 10,356,200 fine ounces.

As in gold, the Philippines show a remarkable increase in silver production. From 100 ounces in 1907, the production of the islands jumped to 1,300,000 in 1908.

A new safety lamp for miners has the lamp bulb enclosed in a large air-tight glass globe, and the heat of the light expands the enclosed air, creating considerable pressure. If the bulb is broken in any accident, the compressed air rushes in and extinguishes and cools the incandescent filament before the explosive air of the mine can reach it. A single-cell storage battery, enclosed in a celluloid case, supplies current for twelve hours on a single charge, yielding a light of between one and two candle power.

# STATISTICS AND RETURNS

## COBALT ORE SHIPMENTS.

Shipments of ore from the Cobalt camp last week consisted of 1,189,157 pounds of ore, divided among nine mines, which included the usual leading shippers and the first shipment from the Beaver.

Shipments from the camp for the year to date total 26,917 tons. Shipments for week and year to date in pounds of ore are:—

|                        | Week ending<br>Nov. 27. | Year to date. |
|------------------------|-------------------------|---------------|
| Beaver .....           | 50,000                  | 50,000        |
| Buffalo .....          |                         | 988,891       |
| Chambers-Ferland ..... |                         | 961,110       |
| City of Cobalt .....   | 41,325                  | 1,141,447     |
| Cobalt Central .....   |                         | 731,328       |
| Cobalt Lake .....      |                         | 141,340       |
| Coniagas .....         |                         | 1,505,830     |
| Crown Reserve .....    | 183,310                 | 5,478,296     |
| Drummond .....         | 220,000                 | 1,672,100     |
| Keeley .....           |                         | 96,000        |
| King Edward .....      |                         | 233,022       |
| Kerr Lake .....        |                         | 2,186,657     |
| La Rose .....          | 262,298                 | 11,646,568    |
| McKinley .....         | 43,903                  | 1,980,535     |
| Nancy Helen .....      |                         | 124,700       |
| Nipissing .....        | 259,328                 | 11,666,749    |
| North Cobalt .....     |                         | 40,000        |
| Nova Scotia .....      |                         | 480,810       |
| O'Brien .....          | 63,993                  | 2,653,153     |
| Peterson Lake .....    |                         | 324,040       |
| Right of Way .....     |                         | 2,726,090     |
| Silver Queen .....     |                         | 684,814       |
| Silver Cliff .....     |                         | 241,820       |
| Timiskaming .....      |                         | 1,746,060     |
| Trethewey .....        | 65,000                  | 1,883,323     |
| T. & H. B. ....        |                         | 1,666,485     |
| Wettlaufer .....       | 58,000                  | 108,000       |

Following are shipments from the Cobalt camp for the week ending December 3rd and those from Jan. 1st, 1909, to date:—

|                        | Dec. 3.<br>Ore in lbs. | Since Jan. 1.<br>Ore in lbs. |
|------------------------|------------------------|------------------------------|
| Buffalo .....          | 53,300                 | 1,052,191                    |
| Beaver .....           |                        | 50,000                       |
| Carnegie .....         |                        | 63,410                       |
| Chambers-Ferland ..... |                        | 961,010                      |
| City of Cobalt .....   | 63,480                 | 1,204,927                    |
| Cobalt Central .....   | 40,820                 | 772,147                      |
| Cobalt Lake .....      |                        | 141,340                      |
| Cobalt Townsite .....  | 54,369                 | 54,369                       |
| Coniagas .....         | 62,958                 | 1,504,378                    |
| Crown Reserve .....    | 123,900                | 5,725,419                    |
| Drummond .....         | 100,000                | 1,772,100                    |
| Foster .....           |                        | 187,800                      |
| Hudson Bay .....       | 120,735                | 1,287,220                    |
| Keeley .....           |                        | 96,000                       |
| Kerr Lake .....        | 126,740                | 2,313,391                    |
| King Edward .....      |                        | 233,022                      |
| La Rose .....          | 124,021                | 12,554,589                   |
| McKinley-Darragh ..... |                        | 1,980,535                    |
| Nipissing .....        | 197,344                | 11,863,093                   |
| North Cobalt .....     |                        | 40,000                       |
| Nova Scotia .....      |                        | 480,810                      |
| Nancy Helen .....      |                        | 124,700                      |
| Peterson Lake .....    |                        | 324,040                      |
| O'Brien .....          | 64,500                 | 2,727,653                    |
| Right of Way .....     | 127,265                | 2,853,355                    |

|                    |                   |
|--------------------|-------------------|
| Silver Queen ..... | 684,844           |
| Silver Cliff ..... | 241,820           |
| Stewart H. J. .... | 62,392            |
| Timiskaming .....  | 1,746,060         |
| Trethewey .....    | 127,500 2,010,823 |
| Wettlaufer .....   | 108,000           |

Ore shipments to Dec. 3rd from Jan. 1st are 55,221,438 pounds, or 27,610 tons.

Total shipments for week ending Dec. 3rd are 1,386,932 pounds, or 693 tons.

## SILVER PRICES.

|             | New York.<br>cents. | London.<br>pence. |
|-------------|---------------------|-------------------|
| Nov 25..... | Holiday             | 23 3/8            |
| " 26.....   | 50 3/4              | 23 3/8            |
| " 27.....   | 50 7/8              | 23 7-16           |
| " 29.....   | 51                  | 23 1/2            |
| " 30.....   | 51 1/4              | 23 5/8            |
| Dec. 1      |                     |                   |
| " 2.....    | 51 1/4              | 23 9-16           |
| " 3.....    | 51 3/8              | 23 5/8            |
| " 4.....    | 51 5/8              | 23 3/4            |
| " 6.....    | 51 1/2              | 23 11-16          |
| " 7.....    | 51 1/2              | 23 11-16          |
| " 8         |                     |                   |

## ASBESTOS.

The Amalgamated Asbestos Corporation has issued its statement of operations for the five months ending October 31st.

## TORONTO MARKETS.

### Metals.

Dec. 8.—(Quotations from Canada Metal Co., Toronto.)  
 Spelter, 6 1/2 cents per lb.  
 Lead, 3.75 cents per lb.  
 Antimony, 8 1/2 to 9 1/4 cents per lb.  
 Tin, 33 1/2 cents per lb. (Very strong and active.) We look for higher prices.  
 Copper, casting, 14 cents per lb.  
 Electrolytic, 14 cents per lb.  
 Ingot brass, 9 to 12 cents per lb.  
 Dec. 8.—Pig Iron. (Quotations from Drummond McCall Co.)  
 Summerlee, No. 1, \$24.00 (f.o.b. Toronto).  
 Summerlee, No. 2, \$23.50 (f.o.b. Toronto).  
 Midland, No. 1, \$21.00 (f.o.b. furnace).  
 Coal, Anthracite, \$5.50 to \$6.75.  
 Coal, Bituminous, \$3.50 to \$4.50 for 1 1/4-lump.

### Coke.

Dec. 6.—Connellsville coke (f.o.b. ovens).  
 Furnace coke, prompt, \$2.80 to \$2.85 per ton.  
 Foundry coke, prompt, \$3.00 to \$3.25 per ton.  
 Dec. 6.—Tin (Straits), 31.90 cents.  
 Copper, prime Lake, 13.50 cents.  
 Electrolytic copper, 13.37 1/2 cents.  
 Copper wire, 15.25 cents.  
 Lead, 4.40 cents.  
 Spelter, 6.37 1/2 cents.  
 Sheet Zinc, 8.50 cents.  
 Antimony, Cookson's, 8.37 1/2 cents.  
 Aluminium, 23.00 to 24.00 cents.  
 Nickel, 40.00 to 49.00 cents.  
 Platinum, \$29.50 to \$33.25 per oz.  
 Bismuth, \$1.75 per lb.  
 Quicksilver, \$52.50 per 75-lb. flask.



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## A Guide to Technical Writing

by T. A. Rickard

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—From the Preface.

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The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

## ENGINEERS, METALLURGISTS AND GEOLOGISTS

|                                                                                                                                                                                 |                                                                                                                                                |                                                                                                  |                                                                                                                  |
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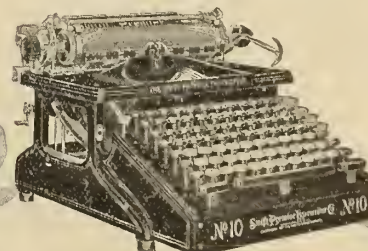
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